TECHNOLOGY DEPT.

FOR VICTORY BUY WAR SAVINGS BONDS AND STAMPS

FEBRUARY, 1945

Industrial FINISHING

Published Monthly in the Interest of Product Cleaning and Painting

FEB 2 7 1945

Salute to the RED CROSS...

• TO OUR FIGHTING MEN, the Red Cross is the symbol of the great tie that binds them to their loved ones at home. They know it stands for an army of men and women mobilized in the name of humanity. Give your blood . . . your money . . . your time. Do your part to make certain that the Red Cross can continue to [illegible] that binds.

ADVANCE PAINT CO.
INDIANAPOLIS
INDIANA

Plastic-Base PALADIN

TAKES ON A TOUGH CUSTOMER

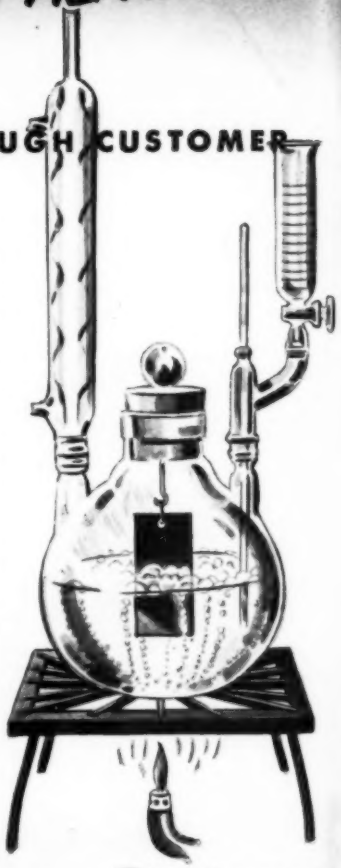
. . . WITHSTANDS 28 DAYS IMMERSION IN BOILING TULUOL!

THAT WAS THE TEST of a leading ammunition manufacturer to prove they had the right finish for their zinc-plated brass fuse assembly.

PALADIN passed with flying colors!

Not only did it cling to the hard-to-finish zinc with unequaled tenacity—but it withstood 28 days in the boiling toluol!

PALADIN clings with equal tenacity to other difficult materials such as cadmium plate, brass, copper, polished chrome, stainless steel, aluminum and glass. It retains its film strength in high humidity and salt spray. Dipped, sprayed or roller coated—its remarkable flexibility and abrasion resistance simplifies production . . . allows pre-fabrication finishing. You will want to know more about this plastic-base protective coating for hard-to-finish materials. Write Department 801 for Bulletin, "FACTS on PALADIN."



ROXALIN *Flexible* FINISHES
INCORPORATED
ELIZABETH, N. J. • NEW JERSEY

ONLY ROXALIN MAKES PALADIN

ENTHONE

Enamel Stripper

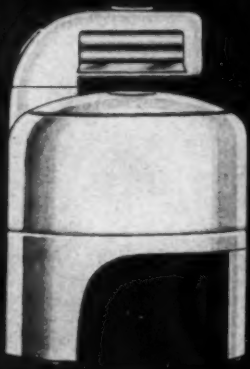
U. S. Patent 2,255,156

ENTHONE Enamel Stripper disintegrates tough enamels such as urea-formaldehydes, melamines, phenol formaldehydes and glyceryl phthalates but is harmless to aluminum, magnesium, zinc, steel or other metals. Even anodized aluminum is unharmed. A minute or two in the solution and the stirring loosens all power of adhesion—wrinkles off the enamel to leave it clean and bright for refinishing. Send a trial order and learn first hand of the efficiveness of this Enthone product.

A Tough Synthetic Enamel being Disintegrated and Lifted Away from Base Aluminum

THE ENTHONE CO. 441 ELM STREET, NEW HAVEN, CONN.

Chemical Products and Electroplating Equipment



ZAPON
REG. U. S. PAT. OFF.

DURANITE

Custom Designed for an Industry

A product that bears your name or trademark deserves quality protection—the kind of protection obtained from a finish with an equally significant trademark, Zapon Duranite.

For years, Zapon's laboratory technicians have conducted a program of testing that has served as a guide in the production of custom finishes for an industry. For instance, Duranite has been scientifically developed to meet every requirement of a durable stay-right finish for washing machines and wringers.

In whites, ivory and pastels, Duranite meets your needs with these qualities: high resistance to water, acids, alkalis, heat and abrasive action.

Now, of course, all facilities must be devoted to war needs but certain Duranite formulations are available.

SALT SPRAY CABINET—One of the Zapon laboratory's many testing devices, this cabinet by accelerated salt spray action provides a quick method of finding out how resistant to corrosion the finish really is.

A FINISH ROLL OF HONOR

DURANITE:	Short bake finishes.
EXCELGLASS:	Elastomer base corrosion-resistant finish.
ZAPONITES:	Lacquer type wood finishes.
DURELASTO:	A new plastic base wood finish.

You can step up sales appeal of many Zapon finishes by using Metalite, a color enhancing finish.

ZAPON
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ZAPON DIVISION

ATLAS POWDER COMPANY

Eastern Sales: Stamford, Conn. • Western Sales: No. Chicago, Ill.

INDUSTRIAL PRODUCT FINISHES . . . *Doing Tomorrow's Job Today*

TWENTY-FIRST YEAR OF PUBLICATION

Industrial FINISHING

W. H. ROHR, Editor E. A. DOSCH, Assoc. Editor

Vol. XXI, No. 4 FEBRUARY, 1945 $2.00 a Year

Contents of This Issue

Letters from Readers 4
We Changed Our Paint Setup to Take On An Emergency War Job 28
Facts About Reclaiming Zinc Chromate Primer 32
Anodizing Aluminum 42
Synopsis On Alkyds 56
Spray Gun Air Caps 62
Questions and Answers 89
Materials; Supplies; Equipment 94
Booklets; Catalogs; Circulars 102
To Correctly Finish Aromatic Red Cedar 104
Editorial 114
Random Comment on the Industrial Scene 122
"Classified Advertising" Section 134
Index to Advertisers 136

How We Improved Our Infra-Red Baking 31
American-Marietta's Sales Up 31
Sales Manager for 3-M 31
Despatch Oven Moves Into New Office Building 53
Two Arco Co. Appointments 53
Hercules Subsidiary in England 60
A Conveyorized Dip-Coating Operation 72
Cleaning Solvent Tanks 74
Machine and Work Room Colors 76
Stripes ½-in. Wide 78
American Chemical Paint Co. Appoints N. Y. Distributor 80
Employment of Handicapped Veterans 80
Heat Resistant Plastic 80
Better Paints for New Civilian Products 82
Resin Fabric Coatings 82
Lonn Blow Guns 86
Standard Identification Colors for Pipes 92
Jones-Dabney Co. Officers 92
Sap-Staining Walnut on Conveyor Line 108
Multiple Spray Booths 110
Frolics in the Finishing Room 110
High-Solids Lacquer 112
Detrex Celebrates 25th Anniversary 112
How to Step Up Production of Grinding and Finishing 112
Laboratory of Paint Baking Offers Choice of Methods 120
Special Paint Prevents Barnacles on Ships 128
How We Have Planned for Reconversion 128
Over-Time Fallacies 132

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Letters from Readers

Spray Mask Wanted

We have a factory customer asking that we supply the type of spray mask worn by the operator shown in an illustration that appeared in INDUSTRIAL FINISHING, consequently we are writing to inquire if it is possible for you to advise who manufactures or sells this particular type of mask.—E. G. S.

Flock Finishing

Shortly before we bought a flock pressure pot, I read a long article on flock in INDUSTRIAL FINISHING. I put away this copy of the magazine so carefully that now I cannot find it. Would greatly appreciate your sending us a copy of INDUSTRIAL FINISHING containing the above named article.—P. S. Co.

Copy furnished.—ED.

To Move and Tilt Drums

Referring to January issue of INDUSTRIAL FINISHING, kindly advise where we might obtain information on the drum lift described in the article, "Moves and Tilts Filled Drums", page 88.—M. W. Co.

This is a product of the Falstrom Co., Passaic, N. J.—ED.

Bede's Article Reprinted

In your November 1944 issue there appeared an article by James A. Bede, on "Spray Painting Troubles—Causes and Remedies".

As manufacturers of spray-painting equipment for many years, we believe this to be one of the finest resumes of equipment difficulties that we have seen. We would like to use the entire contents of this article in a bulletin to our customers. Have you any objections to our doing so, giving of course, due credit to your publication and to Mr. Bede?—Y. Co.

Your are at liberty to reprint the article, under the conditions stated. We are glad you like it.—ED.

Finish for Toy Blocks

Last year we made children's toy blocks of soft wood, such as yellow and white pine. We dipped the products in a water vegetable dye and tumbled them with a paraffin wax in order to give them a wax finish, but this did not give us the gloss we desired.

We are sending you a sample. This is the type of finish we desire on our blocks and are wondering if you could help us solve this problem, using dye or paint that would be non-toxic.—L. MFG. Co.

Your sample wood turning appears to have been colored bright red with a bright red stain or dye and then given a coat of clear lacquer. It may have been waxed too, as it has wax-like feel when picked up. We are referring you to some manufacturers who specialize in toy finishes.—ED.

Peel-off Coating

In the July 1944 issue of the INDUSTRIAL FINISHING Magazine, page 86, we noticed an article about the Ford Willow Run plant using a peel-off coating of Plexiglass. We are interested in the above and would like to contact the manufacturer of that product so that we may get further information.—N. N. Co. (Shipbuilding).

Information supplied.—ED.

Hot Lacquer

We read about Hot Lacquer in your magazine. We would like to have a list of firms who manufacture it, and also a list of those who supply equipment for its application.—Y. M. Co.

Information supplied.—ED.

Rubbing Machines

We are manufacturers of occasional tables and would like to know whether you could give us any information or names of manufacturers to contact in regard to rubbing machines, as we do

☆ AFTER VICTORY

We will immediately have available, all of the products developed in our Laboratories during the past three years.

SAMPLES OF THE FOLLOWING ITEMS ARE AVAILABLE NOW...

NEW:
- Synthetic Enamels
- Sanding Surfacers
- Pearl Essence Coatings
- Lacquer Enamels
- WRINKLE FINISHES
  For wood and metal

IMPROVED:
- Vindolux
- Wateroil Stains
- Comb. Stain and Filler
- DuBar Bleach
- 4500 LACQUER LINE
- 6400 SEALACQUER

Inquiries invited on any Specification Finish

V. J. DOLAN & COMPANY, INC.

Manufacturers of "UNQUESTIONABLE QUALITY" *Industrial Finishes*

1830 N. Laramie Ave. Chicago 39, Illinois

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Whether you *make* or *buy* any of the products listed, you'll make or buy *better quality* if you pre-test them quickly, simply with the marvelous Taber Abraser. Now used by hundreds of America's leading industries. Soon earns its cost many times over. WEAR TESTING MANUAL—FREE! Write today for our new Taber Wear Testing Manual. Shows you how to test, why it pays to test. Contains information that every research department should have.

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The Taber Test *Proves* What Wears Best!

Things You Ought To Know About

SILCO

THE NEW GLASS-BASE METAL FINISH

It withstands more than 200 hours in salt spray, making it a No. 1 corrosion resistant!

It stands heat up to 1000° F.—has therefore, no superior for surface coatings subjected to constantly high temperatures.

More resistant to abrasion than other sprayed on coatings.

It is unaffected by mild alkalis and most acids.

It is available in black, white, any color.

It is simple to work. Spray on, dry at 200° F. then bake at 350° F. in any industrial oven.

Non-priority. Tests JQD515, QM Dept. Navy approval, others.

BLACK-MAGIC

A fast black oxide finish for zinc, copper, brass and cadmium. A rich black that won't rub off. Also a one-bath process for all steels except stainless that works at 300° F. Non - priority. Ordnance approved. Samples on request.

"BLACK MAGIC" SALTS
•
"WITCH DIP" FINAL FINISH
•
SILCO VITREOUS-TYPE FINISH

MITCHELL-BRADFORD
CHEMICAL COMPANY
MODERN METAL FINISHES

2446 P. MAIN ST., Stratford, P. O. BRIDGEPORT, CONN.

Midwest Field Office, 2651 W. Greenleaf Ave., Chicago 45

all of our finish rubbing by hand. We are subscribers to your magazine but we have seen only one portable rubbing machine advertised.—W. F. Co.

Information supplied.—ED.

Heat-Proof Coating

We are in receipt of a request from a stove company for a material that could be used as a finish, or which could be used in a form such as sheet steel, which would stand a heat of between 700° and 900°F.

We will appreciate any information you may give relative to a material which would meet the above specifications, or any references to other authoritative sources where we may obtain additional information.—LIBRARY OF INDUSTRIAL RESEARCH.

We are submitting the names of several manufacturers of heat-resistant coatings.—ED.

Silk Screen Stenciling

We are very much interested in any information you can give us regarding silk-screen work; kind of paint used, etc.—M.&N. Co.

We are sending you the names and addresses of manufacturers of equipment, supplies and materials for the making and use of silk-screen stencils.—ED.

More Tumbling

G. J. Nikolas & Co. referred us to you in connection with information on tumbling barrel coating. We are particularly interested in the tumbling of small wood knobs, and would appreciate any help you could give us on the subject.—J. R. & M. (Recording Machines).

Will you please put my name on your list to receive monthly issues of INDUSTRIAL FINISHING? I would also like to have copies of those back issues wherein you have published articles describing the process of smoothing and finishing wooden parts by means of tumbling barrels.—S. & Co. (Bookstacks).

Please send us tear sheets of past articles in INDUSTRIAL FINISHING in connection with sanding and finishing by the tumbler method.—C. & H. (Chairs).

Would greatly appreciate receiving a reprint of "Tumble Finishing". We

THE DIFFERENCE IS *CLEAR!*

PERFECTION FLAT FINISH Free From All Distortion . . . Transparent As Clear Glass

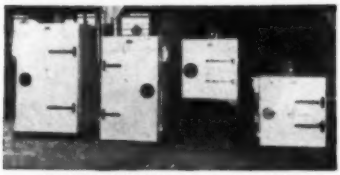
● Just as PERFECTION FLAT FINISH shows the beautiful girl in all her loveliness, so does it reveal the full beauty of wood grain and stain when applied to furniture.

PERFECTION is as unlike other flat finishes as day and night. Unique product of synthetic chemistry, it contains no beauty-masking stearates or other flattening agents. That's why PERFECTION is *always perfectly clear, always free from distortion*—why it adds dollars to the value of your products.

For convincing proof, try PERFECTION in your own plant. Fast drying, water-proof, liquor-proof—free from orange peel—PERFECTION FLAT FINISH is available in a full range of beautiful and durable sheens.

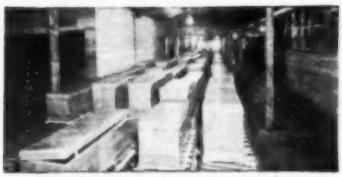
PERFECTION
PAINT & COLOR COMPANY
Indianapolis, Indiana

NAME YOUR NEEDS-
BAKING OVENS?



KOCH OVENS . . built to the size you need . . in the design best suited to your production requirements . . from standard units . . can be installed in double-quick time.

FINISHING SYSTEMS?



KOCH is leading the way with individualized finishing systems for manufacturers of all types of products. A long record of increased production and lowered costs is the result of the hundreds of successful KOCH installations now in service.

Phone, Wire or Write—

GEORGE KOCH SONS, INC.
INDUSTRIAL EQUIPMENT
EVANSVILLE 4, INDIANA

shall gladly pay you for any cost involved. — L. INDUSTRIES. (Specialties).

Information supplied.—ED.

Rubbing Finish on Crucifixes

In the November issue of this magazine, in the section devoted to "Letters from Readers", you have an inquiry signed by L. F. Co., relative to rubbing images.

Our problem is how to get a good smooth finish on wooden crucifixes. We have always rubbed these by hand and we thought possibly that the machine method would be helpful to us. Any information you can supply on this matter will be greatly appreciated.—C. J. Co.

Portable rubbing machines, such as those referred to, would probably be too large for use on articles as small as crucifixes. About the only suggestion we would have for rubbing such small articles would be to use a buffing wheel—either a buffing wheel mounted on a stationary arbor (like a grinding wheel), or a smaller buffing wheel mounted on the end of a flexible shaft.

In the case of the buffing wheel on a stationary arbor, the operator would present the work to the wheel. However, in the other case, the buffing wheel would be moved to the work, which would probably be positioned flat on a work bench or table. If you are interested in buffing wheels, we feel sure that some supply house in or near your city can take care of your requirements.—ED.

Degreasers; Ovens

Would appreciate it if you could send me a list of manufacturers of metal degreasing machines. Also a list of manufacturers of industrial baking ovens. Our interest in the above list is for the purpose of getting estimates for one of each of these items.—A. F. Co. (Lighting Fixtures).

Viscosity Cups Wanted

We will appreciate your letting us know where we may purchase two Ford viscosity cups. We want only the cups, not the automatic timing device. If you prefer, you might refer this inquiry to the manufacturer, asking them to ship the two cups to us, C.O.D., if desired.—P.&L. Co.

STILLE-YOUNG

quality standards have been
maintained or advanced—
even under war conditions—
even in the manufacture of
"emergency" products.

MANUFACTURERS

Lacquers Fillers Stains
Enamels Paints

☆

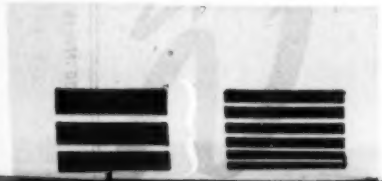
Stille-Young

2300 North Ashland Avenue • Chicago 14, Illinois

Here's How HIGH-SOLIDS Lacquers Cut Finishing Costs

It's not the cost per gallon that determines finishing costs—more important to consider is the finishing cost per unit!

High-solids lacquers mean thicker, fewer coats and many other savings that cut production costs drastically. Here's how:



quers deposit thicker films at spraying viscosity, giving you

with high-solids lacquers. The fewer number of coats, the

lacquers by any of the usual commercial methods . . . spray-

quers deposit thicker films at spraying viscosity, giving you the same finish with fewer coats.

with high-solids lacquers. The fewer number of coats, the smaller the area needed for finishing and work in process.

lacquers by any of the usual commercial methods . . . spraying, flow-coating, tumbling, dipping, or roller-coating.

Nitrocellulose lacquers are still the fastest-drying finish . . . in minutes at room temperature. No expensive baking equipment is needed.

One of lacquers' biggest advantages is the ease with which any scratches or imperfections in the finish can be retouched or repaired.

Ask your supplier for complete details. Hercules makes no lacquers . . . concentrates on production of highest-quality nitrocellulose.

HERCULES

HERCULES POWDER COMPANY
INCORPORATED

928 Market Street, Wilmington 99, Delaware

CL-82

THE LILLY COMPANY
HIGH POINT, N. C.

Where EXPERIENCE Counts...

A ship's navigator bears a heavy responsibility. He alone, is held accountable for charting a safe course . . and on his knowledge and experience depend the lives of his shipmates.

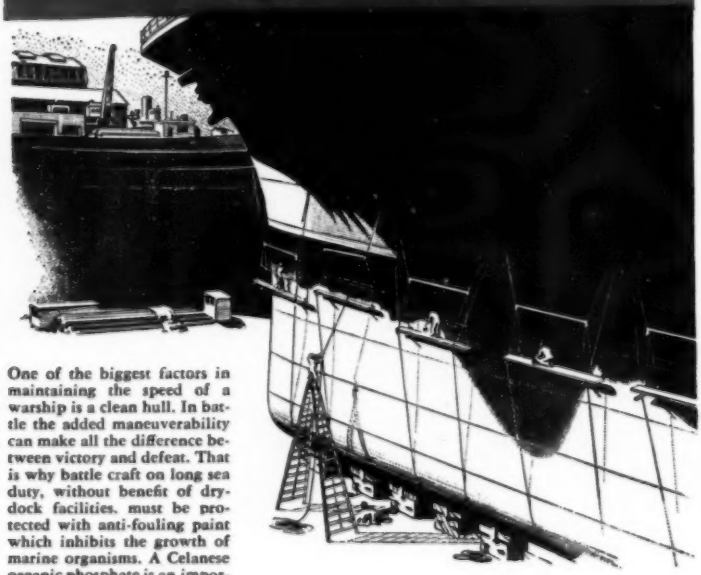
★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

EXPERIENCE ALSO COUNTS in making finishing materials—and we have that experience. We have been making finishes for 80 years, (since 1865) . . . and more important, we have been making specific finishes for specific products and purposes for 24 years (since 1921). Fourteen years ago we adopted the slogan "With the right finish—you'll finish right." This slogan applies in war or peace, in good times or bad . . . and we have the experience and knowledge to produce the "right" finish for you.

★

LILLY VARNISH COMPANY
INDIANAPOLIS, IND.

Celanese* Chemicals



One of the biggest factors in maintaining the speed of a warship is a clean hull. In battle the added maneuverability can make all the difference between victory and defeat. That is why battle craft on long sea duty, without benefit of dry-dock facilities, must be protected with anti-fouling paint which inhibits the growth of marine organisms. A Celanese organic phosphate is an important ingredient of such coatings.

CELANESE CORPORATION OF AMERICA

. . . research in terms of your objectives

CELANESE RESEARCH has always stated the premise that synthetics can and should meet specific needs with precision. This policy has been translated into practical results many times by the Celanese chemical division.

The extensive development of an entire series of organic phosphates has resulted from a willingness on the part of Celanese to thoroughly study specific customer requirements and then through research to match the material to the need.

Consider the field of vinyl compounds, for instance, which requires a great variety of plasticizers with a wide range of characteristics. Celanese has met many new needs, each with precision. The result has been plasticizers with improved electrical properties, plasticizers with special qualities of solubility, plasticizers with non-flammable characteristics, plasticizers that combine flexibility with resistance to high temperatures, plasticizers for non-toxic films coming in contact with foods.

Today Lindol*, Lindol* E.P., Lindol* M.P., Celluflex* and Cellulube* are dependable names to the chemical engineer. Lindol E.P. in particular is playing a direct war role in aviation motor oil. Used as a lubricant additive, it increases film strength many times over and acts as a solvent for resinous deposits. It supports greatly prolonged periods of engine operation.

Many of the most useful synthetic developments have come from approaching a need with an entirely open mind, from working to create a new combination of characteristics to meet a goal, rather than modifying a goal to an existing set of characteristics. The Celanese organization is qualified to handle and welcomes research in terms of your objectives. Celanese Chemical Corporation, a division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

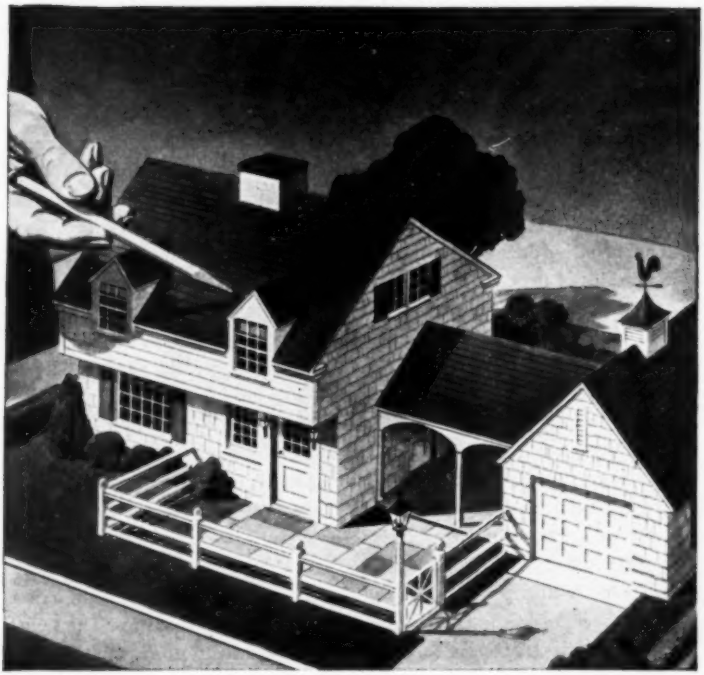
PLASTICIZERS
ORGANIC PHOSPHATES
LUBRICANT ADDITIVES
INTERMEDIATES
DYE-STUFFS

*Reg. U. S. Pat. Off.

TEXTILES • PLASTICS • CHEMICALS

Do you know...?

Quiz on timely production short-cuts—No. 12



Q. Postwar prefabricated houses, like this, may cost as little as:

☐ $2,000 ☐ $7,500 ☐ $15,000

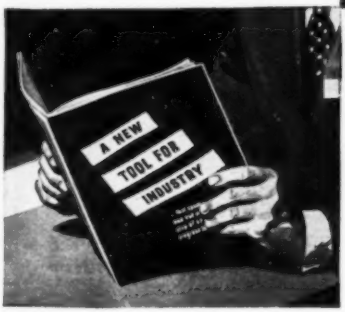
A. Economies made possible by mass production may permit a price as low as $7,500 for a house of this type. One of the important mass-production techniques in this field will be the use of pressure-sensitive tapes in manufacture, shipping, and assembly. Permacel paper masking tape will speed color-separation painting. Permacel moisture-proof cloth tape (Utilitape) will protect metal parts against corrosion during shipment. Permacel double-faced tape will hold protective "liners" on enamel fixtures. Permacel cloth tape (Jonflex), used to bundle related parts, will speed assembly. And these are but a few of many time and money-saving uses in this field.

Q. Protective enamel on aircraft engine parts is dried at temperatures up to:
☐ 100° ☐ 300° ☐ 500°

A. 300°. To speed production, the temperatures in paint-drying ovens had to be raised—a masking tape was needed to stand up under high heat. Permacel's high-temperature masking tape helped solve this problem. Hangs on tight till the job is finished, then strips off clean.

Q. This postwar package may be sealed with same tape now used to:
☐ Protect wing ribs ☐ Insulate wires
☐ Seal shell canisters

A. Permacel's companion, Texcel cellophane tape—now used for protecting wing ribs and many other war jobs—will find many uses in postwar packaging. Shirt envelopes, candy boxes and suspender containers are but a few of many items this tape will seal better.



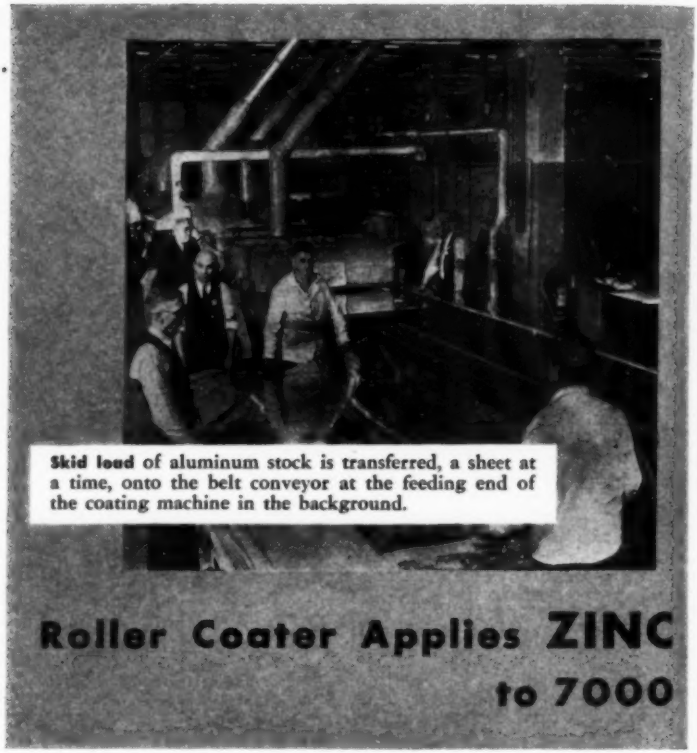
Q. The title of this booklet refers to:
☐ Electricity ☐ Tape
☐ New-type wrench

A. Pressure-sensitive tape. This free booklet shows how Permacel Industrial Tapes speed production and cut costs all along the production line. Illustrates and lists many applications that may be helpful in your business during conversion and after. Write for *your* free copy today: Dept. IF-12, Industrial Tape Corp., New Brunswick, N. J.

IMPORTANT: *Our research laboratories are at your disposal for development of special tapes to meet war or postwar needs.*

Permacel Industrial Tapes

INDUSTRIAL TAPE CORPORATION · New Brunswick, N. J.
Makers of Texcel Tape "PERMACEL" REG. U. S. PAT. OFF.

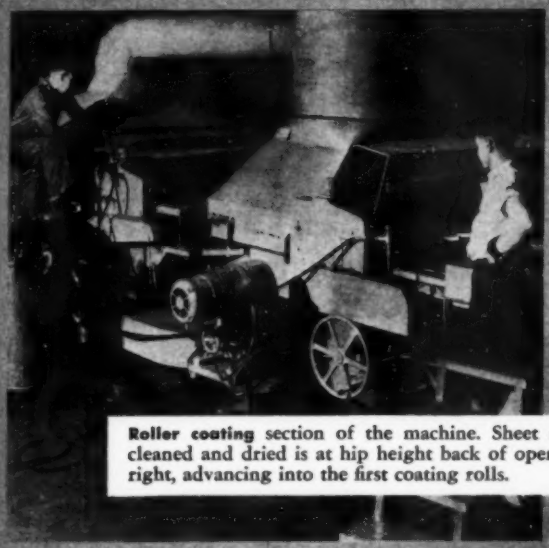


Skid load of aluminum stock is transferred, a sheet at a time, onto the belt conveyor at the feeding end of the coating machine in the background.

Roller Coater Applies ZINC to 7000

Sheet stock is cleaned, finish applied on both sides, and dried in a continuous run through revolutionary machine at plant of leading aircraft manufacturer

SPEEDING UP production of vital aircraft components is forcefully illustrated at the plant of Douglas Aircraft Co., Inc., Park Ridge, Ill. Prior to the development of a revolutionary new machine, illustrated here, primers were applied to aluminum sheets by spraying. ★ ★ ★ Now these sheets are *roller coated*, at a rate of 3 to 7 per minute, which is many times faster than spray coating. In one continuous operation, the "Roller Coater" cleans, applies zinc chromate primer on *both* sides, and dries aluminum sheet stock at the Douglas plant. ★ ★ ★ Thus, what might have been a serious "bottle neck" has been entirely eliminated. It is just one example of how Pittsburgh is working hand-in-hand with producers of critical war materials to finish the job faster!



Roller coating section of the machine. Sheet already cleaned and dried is at hip height back of operator at right, advancing into the first coating rolls.

CHROMATE PRIMER Aluminum Sheets a Day!...

Pittsburgh Aircraft Finishes

The Paint Division of the Pittsburgh Plate Glass Company supplies vast quantities of aircraft finishes for all types of planes, including the specially formulated Zinc Chromate Primer used in the Douglas "Roller Coater."

Among other important developments is Pittsburgh FABSEAL, an impregnated fabric tape used in pressurizing aircraft cabins for high altitude flying. Expert advisory service is offered, and our extensive experience in the field can often save you time and money.

PITTSBURGH PLATE GLASS COMPANY, Industrial Paint Division, Pittsburgh, Pa. Factories: Milwaukee, Wis.; Newark, N. J.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Dizzler Color Division, Detroit, Mich. The Thresher Varnish Co., Dayton, O.

PITTSBURGH *Industrial* FINISHES

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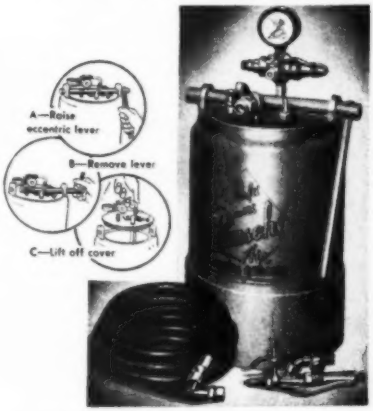

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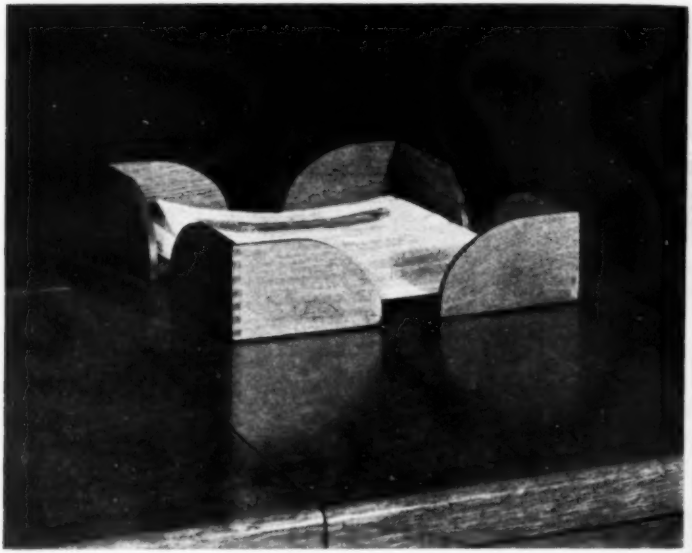

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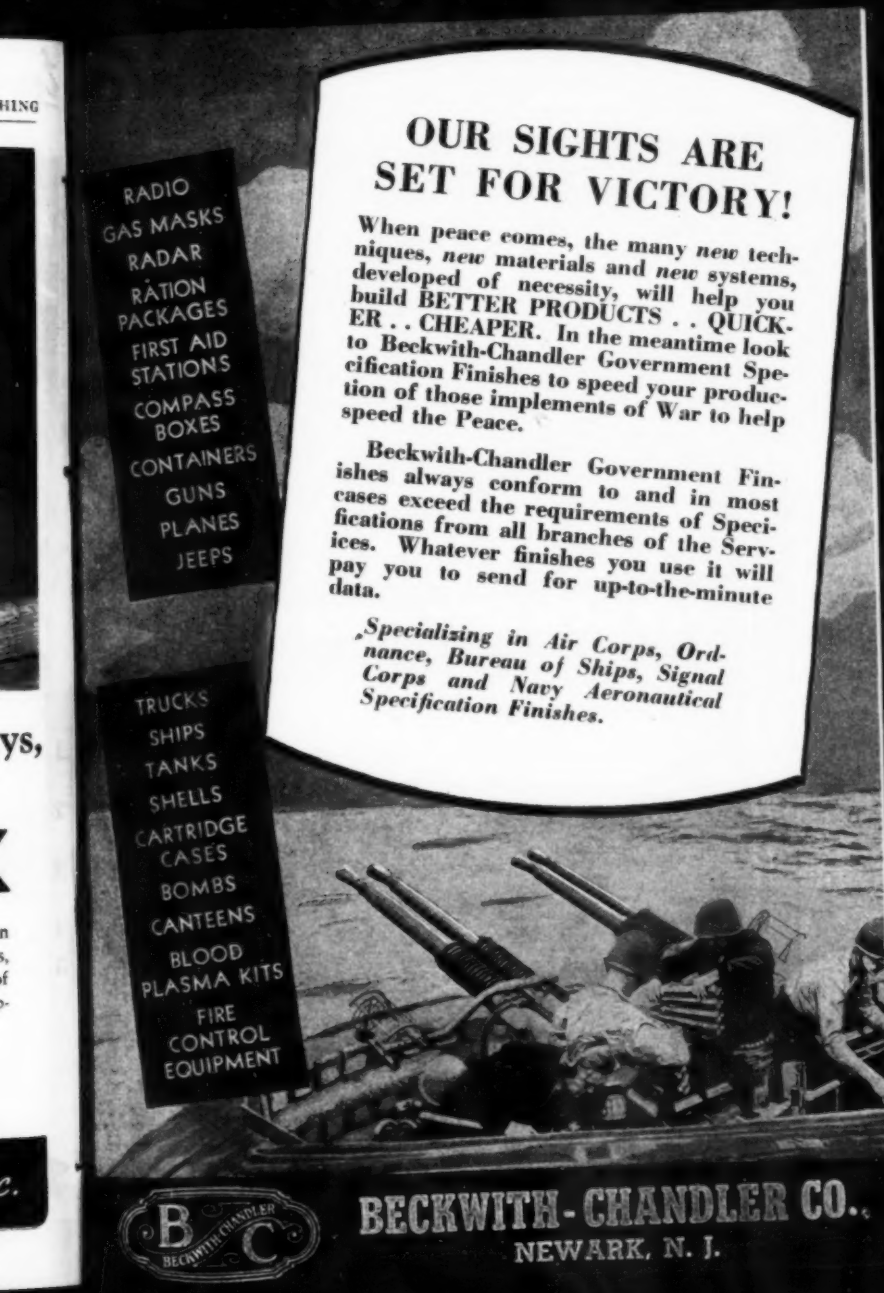
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When peace comes, the many new techniques, new materials and new systems, developed of necessity, will help you build BETTER PRODUCTS . . QUICKER . . CHEAPER. In the meantime look to Beckwith-Chandler Government Specification Finishes to speed your production of those implements of War to help speed the Peace.
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NO DISCOLORATION
CLEAR AND IN ANY COLOR
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INFRA-RED EQUIPMENT MANUFACTURERS and PAINT MAKERS CAN AGREE ON

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No longer is "passing-the-buck" a game to be played by paint men versus equipment men. No longer is the "buyer" in the middle as to whether paint or equipment is responsible for unsatisfactory results.

Penetray's exclusive ceramic coating improves wavelength, producing more intensive color, thorough curing and superior polymerization on metals. In addition, insect attraction is minimum because glare is reduced and improved uniformity of energy distribution results. Prove these points. Make your own tests for color and gloss; for corrosion and abrasives.

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LEARN TO SAY »PENETRAY

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that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.
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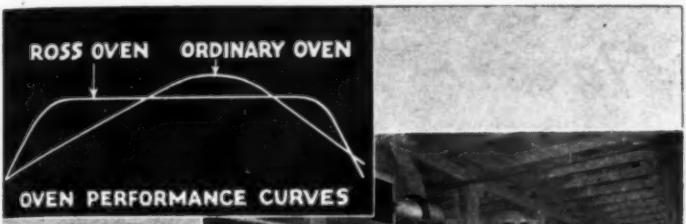

Note rapid uniform rise in temperature and flat curve of the ROSS OVEN as compared to the type of curve obtained with the ordinary oven.

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for Can, Pail and Steel Drum decorating

Metal Lithograph Oven

Its advanced design meets all the exacting requirements for automatic control, absolute uniformity of temperature across the sheet, maintaining any predetermined temperature curve throughout the length of the oven—no hot spots. Independent zones, each with its own circulating system and control, large volumes of air uniformly circulated throughout the oven, fast uniform adequate cooling—all combine to make this the outstanding oven for metal lithographing. The facilities of our Laboratory are available for determining your particular conditions and requirements. Write us—no obligation.

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We Changed Our Paint Take On An Emergency

A SHORT TIME AGO THE management of our company was consulted by representatives of a neighboring firm, engaged in critical war work, who had a problem that was causing them considerable worry. Their situation was as follows: Although they were fully occupied 24 hours a day, turning out an important item for the Government, they received a rush order from the Navy Department for a number of prefabricated ammunition magazines or huts to be completed at a specified time.

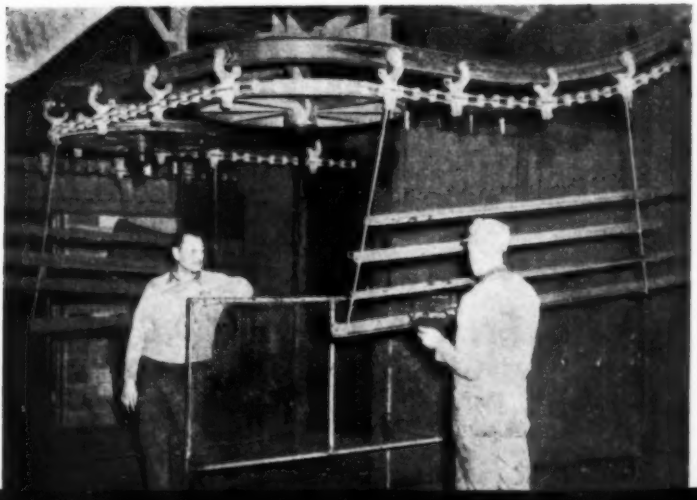
Our Neighboring Firm Was in a "Jam"

Fabrication of these units presented no problem. They were quickly and efficiently manufactured. The bottleneck was reached when the units were ready for painting. This company, while well equipped to take care of its regular contract work, was not in a position to paint these units on a production scale. Faced by long-drawn-out hand cleaning, handling, and air drying methods, they decided to seek outside aid, to help them to meet their schedule.

Our company decided that if it were at all possible, we would help them meet this emergency, knowing that by so doing, we would be contributing something additional to the essential war effort.

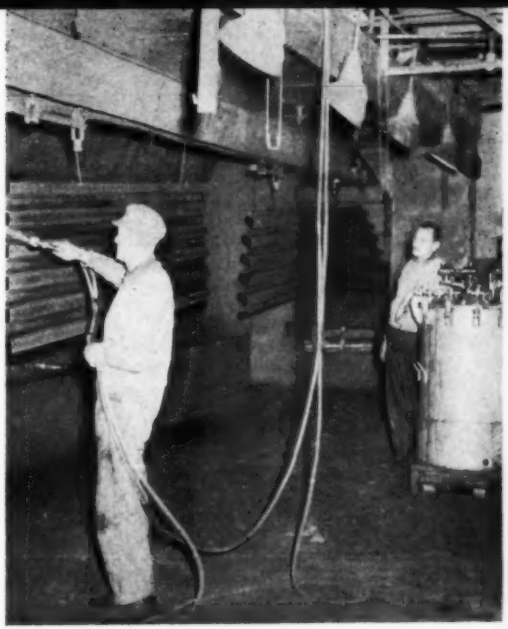
Our engineering department immediately went to work to determine what changes would be necessary in our setup to handle this unit on our conveyor line. Each

Angles entering and emerging from gas-fired baking ovens. The operator in foreground is applying the identifying letters and numbers with small brush.



Setup to War Job

BY DALE W. MUSSELMAN



Corrugated panels passing through final color booth and receiving coating of lusterless olive drab.

unit consisted of many prefabricated section panels and connecting angles of varied sizes and shapes, including a pair of large doors per unit. The 61 separate parts of the unit, which we were called upon to paint, comprised many of the larger and more difficult pieces to handle. The completely assembled unit measures about 20x20-ft. and 12-ft. in height. The roof is straight from front to back but curved at the top and sides, and very strongly built to resist extreme weight from above. Certain panels were corrugated to increase their strength.

Changes We had to Make in Our Conveyor Line

The doors and some of the panels, were larger than any item that we had previously carried on our conveyor line. A general survey and several test runs of a few of the larger pieces showed us what changes would be necessary to successfully paint the units on a production scale. Since our previous contract had been for shell cases, painted by a dip-coating system, a 5-ft. radius curve in the line at the dipping booth had to be replaced by a section of straight track to insure satisfactory clearance of the floor by the large panels and doors.

A baffle, which we had installed in our large metal cleaning machine to tip the shell cases so as to allow entrapped liquid in the recessed ends of the cases to flow out, had to be temporarily removed. Special hangers were designed and made to meet the requirements of panels and angles of different sizes and shapes. Our special roller hangers were used for the large panels and doors to enable them to traverse various sharp curves in the line without bumping or causing damage, either to the pieces or

to the equipment through which they had to pass.

Several other small changes in the position of equipment, at other points on the line, were made to facilitate the free passage of large panels through the various departments. Our four water-wash spray booths were already in use on a spare parts contract — with one spray gun station in each booth, and the guns supplied by 60-gallon pressure tanks.

Metal Cleaning; Rinsing; Etching; Oven Dry-off

After two days of intensive preparation we were ready to start the job. Our finishing procedure on the units was as follows: After the correct hanging and spacing of each piece on the conveyor line, each part passed through our large spray-type automatic cleaning machine, receiving in succession: A hot caustic wash to completely remove all oil and grime, followed immediately by a warm water rinse. Then they passed through an acid solution, which chemically prepared the metal for priming, by producing an etching action and a deposit of light phosphate coating upon the etched surface. Finally every treated item passed through a gas-heated oven at the end of the cleaning operations. As a result, all surfaces were thoroughly dried, and they presented a clean warm surface for the initial coating of paint.

Rust-Inhibiting Primer; O. D. Enamel; Oven Baking

Passing through the first two paint booths, each part received a full extra heavy coating of a fast-drying specification rust-inhibiting primer. During the 7-minute period occupied in traveling from the initial priming booths to the final coating booths, the primed parts dried sufficiently to receive the final coat, due to the fast drying quality of the primer and its application upon a thoroughly warm surface. Entering the final coating booths, the parts received a special heavy coating of specification lusterless olive drab enamel. This final coating received a 10-minute flash period, before entering our gas-fired convection-type oven.

Immediately before entering the oven, each part of the unit was given its identification number. This was accomplished by using a small lettering brush and hand-painting the identifying letter and numeral on the inside of each piece, with red marking paint. One operator handled this job satisfactorily.

Applying this marking paint before the pieces entered the oven accomplished two purposes. It eliminated the possibility of a messy handling of pieces marked with fresh paint, and it prevented confusion at the crating end, as the workers who removed the parts from the conveyor could easily identify the parts and place them in the proper packing box, without making any mistakes.

We maintained our oven at a temperature of about 275°F. and gave the units a 25-minute bake, thoroughly drying the paint film and the marking paint. After leaving the oven, the parts were checked for touch-up while they were still warm. Upon entering the crating department, the parts were removed from the conveyor and placed in the proper packing boxes.

After packing and sealing the various parts, each packing box was correctly stenciled, and the U. S. Navy marking was placed on all six surfaces of each box. Shipping tags were securely fas-

tened to the ends, and each box was tightly banded. All stenciling and markings were given a protective clear coating and the boxes were ready for shipment.

A durable protective coating is a vital requisite for these units, because of the fact that when they are put into use in some distant strategic point of our military endeavor, they are practically buried beneath sand or earth, for protection and camouflage purposes. They are therefore constantly subjected to the dangers of corrosion.

In ten days, including the time taken for preparation, we had finished our part of the job (without any serious interference in our own contract work) thus enabling our neighboring concern to meet its war-product schedule promptly.

How We Improved Our Infra-Red Baking

WE HAVE a conveyor-type infra-red oven which is 18-ft. long. It has three banks of lights, each bank having 42 lamps. The first bank had 42 carbon-filament lamps, which gave us a temperature of 70° to 150°F. The next two banks had 250-watt drying lamps, which started at 175°F. and leveled off at about 275°F. The running time of the conveyor for the 18-ft. was 18 minutes, which did not give us a good hard finish on enamels. Even though we baked our wrinkle finishes twice, it was not satisfactory.

To overcome this trouble we replaced the first bank of carbon-filament lamps with 250-watt baking lamps, and put in G. E. Mazda-type R40 lamps in the other two banks. Now we are getting a satisfactory bake job. The temperature change, after we made this change in lamps, started at 200°F. and, starting at the second bank, it leveled off at 350°F. These temperatures were taken with a thermo-couple thermometer, with the conveyor slowed down to 23 minutes for the 18-ft. on wrinkle or oxide primers, and speeded to 15 minutes for enamel.

The type R40 lamps are reflector type and they save us considerable time, as they do not require the usual washing and cleaning with rouge, which we had to do with the carbon-filament and baking-type lamps that have separate reflectors. The new lamps seem to do a much better job of baking and do not burn out as rapidly as the others.

I have mentioned this experience of ours with the idea of suggesting something that might be of help to other concerns who have small infra-red baking installations—and who may not be getting the best possible results from same.—JEROME G. STIEGLER.

American-Marietta's Sales Up

Grover M. Hermann, president of the American-Marietta Co., reported to the stockholders at their annual meeting that sales of the paint company and its subsidiaries for the year 1944 amounted to $11,389,057.53. Profits before income and excess profits taxes were $1,084,005.55 compared with $746,008.14 for the previous year. Taxes were $744,995.57 against $519,070.49 for 1943, and net profits of $316,844.82 were an increase of 45.68% over the previous year.

Sales Manager for 3-M

Bernard W. Lueck, a sales engineer in the tape division of Minnesota Mining & Mfg. Co. for the last several years, becomes products sales manager of industrial "Scotch" masking tape, sandblast stencil and "Scotch Rap," with headquarters in St. Paul, Minn. He joined 3-M in 1935.

FACTS ABOUT RECLAIMING
Zinc Chromate Primer

BY MAXWELL STILES

ALTHOUGH ZINC CHROMATE primer is not now being used as extensively on Army combat aircraft as formerly, enough of it is still being applied, in one form or another, to make savings in time and critical materials worthwhile where obtainable.

With this thought in mind, process engineers of the Lockheed Aircraft Corp. conducted chemical research and laboratory tests on reclaimed zinc-chromate-primer sludge which, it was hoped, would save the company several thousand dollars a year. The results, while not encouraging to the aircraft industry for a dual reason, indicated that for other uses the reclaimed sludge would be entirely satisfactory if it could be produced cheaply enough.

Where Reclaimed Zinc Chromate Primer Can Be Used

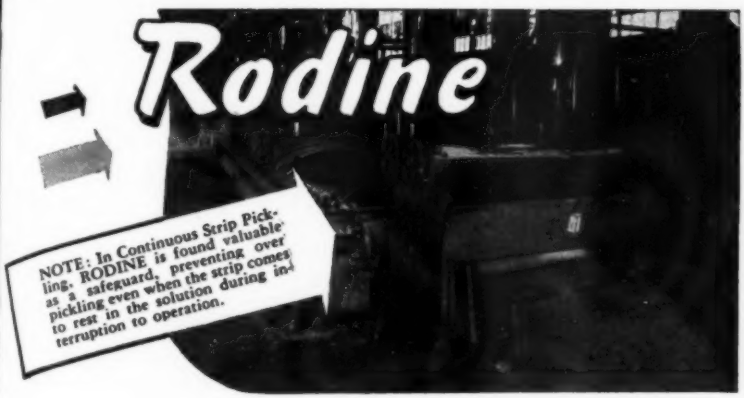
Lockheed's process engineers now recommend that reclaimed primer may be used for airplane assembly work, except on the exterior surface of the airplane. It was found to be satisfactory as far as usability is concerned, but the price charged by the outside contractor for processing it was too great to make possible the savings that had been anticipated.

It is felt that if a company engaged in the manufacture of automobiles, or other products that might require a primer, were to secure used zinc chromate sludge from an aircraft plant where it is used in great quantities, and where it could be obtained at almost a give-away figure, and then do its own processing, the reclaimed primer could be used at considerable savings. Furthermore, it would be satisfactory in every respect. For all practical purposes, including protection of bridges, buildings, etc., it could be sprayed with a 10% water content.

How Z. C. Primer Tested in the Weatherometer

It is recognized that a weathering test period of two months is not adequate to prove with finality the acceptability of a finishing material, but on the presumption that such a test would be indicative of success or failure, a report by Lockheed's Glenn B. Weible (who with P. M. Reedy of the same company and process engineers representing Max Factor & Co. conducted the experimental work) concludes with the following interesting observation:

"Panels were sprayed with new primer and reclaimed primer, and were submitted to weathering tests in the weatherometer, the salt spray box, and the weathering rack on the roof of the laboratory. These tests were continued for a period of two months, at which time the reclaimed primer proved to be superior in durability to that of new primer. (A longer and more severe test might not have borne out this finding, but


Rodine
NOTE: In Continuous Strip Pickling, RODINE is found valuable as a safeguard, preventing over pickling even when the strip comes to rest in the solution during interruption to operation.

Makes Possible, WITH SAFETY, *Faster Production and Increased Actual Tonnage Yield of Pickled Steel*

RODINE permits the use of stronger acid concentration and higher temperatures without danger of over pickling or etching, thereby speeding the process and increasing output.

It is possible with **RODINE** to safely obtain increased tonnage with present equipment—a valuable consideration now when needful new equipment is difficult or impossible to secure.

RODINE-controlled pickling produces a smooth, bright, clean surface. There is no pickling condition which is not improved with Rodine, except where deep etching is desired. Rodine confines the action of the acid in the pickle bath to removal of scale, thus minimizing the acid attack on clean metal and overcoming deep pitting and embrittlement.

There are types of **RODINE** suited to the varying pickling problems. The experience of ACP Technicians is at your service to recommend the Rodine and method best suited to meet your needs if you will write in detail to Dept. B-2.

MANUFACTURERS OF INHIBITORS AND METAL WORKING CHEMICALS

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Note—West Coast Plants may address inquiries and orders for prompt delivery to Leon Finch, Ltd., 720 East 59th St., Los Angeles, California

at least here was a road sign pointing in a certain direction.)

"Because of test results, an order was placed with Max Factor for reclaiming the sludge being collected from our paint booths. This material has proved satisfactory."

Question as to Whether Reclaiming Is Worthwhile

It was right after the material had proved satisfactory that the Army contradicted itself by first rejecting the reclaimed sludge as containing too much water and then deciding that no primer of any kind was required on Army combat aircraft. Insofar as those who conducted the research at Lockheed are concerned, the reclaimed sludge is still satisfactory in itself, but the cost of reclaiming it through an outside company was so great that the net savings did not seem to make the effort worthwhile.

The importance of being able to reclaim the primer—if it is reclaimed by the company that uses it, so that a money savings would be achieved—may be seen at once in the rather startling statement in the report that, "approximately only 50% of the paint leaving the spray gun reaches the part, while the balance is carried off into a curtain of water on either side of the booth and collects in a water tank below, or is wasted in coating the paper covering the conveyor belt." It was to cut down this waste to a minimum that the experimental work on reclaiming the primer was conducted at the request of the Army.

As background for the experimental work, Mr. Weible states:

"It is known that the automobile industries have had considerable success in reclaiming surface coating materials and rendering them suitable for further use, thereby bringing about a substantial savings. In the case of zinc chromate primer the saving of the chromate pigment is very desirable, due to the scarcity of this material, thereby making this project desirable both from a monetary standpoint as well as the conservation of strategic material.

"Before research was started on this problem the larger paint companies were contacted. No interest was shown as to the reclaiming of this material at that time. However, we eventually received cooperation from one large manufacturer who expressed gratitude that independent non-competitors were handling the material.

Problems of Reclaiming, Cleaning and Conditioning

"When the reclamation project was started, a 5-gallon bucket of the sludge was selected to be used in preliminary tests by Lockheed process engineers. This sludge was part of that removed between each shift, or at lunch time, from the automatic conveyor spray booths.

"After trying out several methods of decontaminating the sludge of foreign materials—such as the deflocculating agent, small pieces of metal, particles of paper and wood, etc.—the most efficient method found was: While the sludge was in a flocculated state and thoroughly wetted by water, a series of water rinses served to remove the deflocculating agent and to separate the paper, wood and metal particles from the sludge."

Then came the fly in the ointment, the overalls in the chowder, the complexity in the problem. The decontamination had been achieved. But the process of dehydrating the

For Conditioning Steel Before Painting or Other Organic Finishing

OAKITE CRYSCOAT PROCESS

TRADE MARK REG. U.S. PAT. OFF.

Out of the war has come this revolutionary LOW-COST process made possible by Oakite CrysCoat No. 86, designed for treating surfaces of steel and iron parts so that when paint is applied, it grips surfaces, adheres tenaciously.

Performing THREE distinct functions in ONE time-saving operation, Oakite CrysCoat No. 86 helps you step-up production, reduce rejects, secure improved results because it:

1. *Effectively, safely removes light oil, grease, dirt from steel and iron parts.*
2. *Imparts to surfaces a microscopic coating that assures improved grippage . . . more tenacious adhesion of paint, lacquer, varnish.*
3. *Inhibits surfaces against rusting before application of paint or other organic finishes.*

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A 4-page Special Service Report gives you further details, describes applications and the many advantages obtained through the use of Oakite CrysCoat No. 86. Write for your FREE copy today.

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OAKITE MATERIALS—METHODS—SERVICE — Buy Bonds for Victory — CLEANING FOR EVERY CLEANING REQUIREMENT

sludge to meet an ANA specification, calling for a maximum of .4% water content in the finished primer, was something else again. It was found that this portion of the specification was impossible to meet, due to the fact that the synthetic resins used in the formulation of zinc chromate primer will polymerize under heat or air exposure.

Therefore, it was impractical to heat the sludge to get rid of the water; nor was excessive drying of the sludge allowable. But Mr. Weible didn't invoke the aid of Volstead to make the primer dry. Instead, he devised a means of mechanically pressing the water out of the sludge, then shaving the pressed sludge into thin flakes and drying it under vacuum. He found the drying time to be excessive—24 hours—but reports that "although the water content of this material was not determined, it is believed to be closer to the original packaged primer than the commercially reclaimed material".

Weible further states: "The use of a 3-roller laboratory paint mill was felt essential for milling the sludge at the beginning of our laboratory work, but as the work progressed it was found that an apparently acceptable primer could be compounded without grinding. The elimination of this step is a great help in commercially processing the sludge, as the solvents used for thinning zinc chromate primer are so volatile that it would take a water-cooled mill to accomplish this grinding and would raise the processing cost."

Quoting from Lockheed's chemical research memorandum on the subject, the following outline gives a summary of the most practical laboratory process of reclaiming sludge: (Patents were issued in 1934 or 1935, covering the reclaiming procedure described herein. They are held by two Detroit men.)

Practical Laboratory Process of Reclaiming Sludge

1) Clean sludge was removed from the spray booth tanks and washed free of deflocculating agent and then squeezed partially dry.

2) It was then cut into thin flakes and dried under vacuum, using calcium chloride desiccant. Drying time was about 24 hours.

3) The amount of volatile solvent required to be added to the resins and pigments in order to duplicate the original package material was calculated and added to a weighed sample of the salvage sludge.

4) After several hours' stirring the mixture turned into a smooth creamy mass.

At this point the primer showed a physical appearance similar to that of the original packaged material, as received from one of the paint companies. Unfortunately it was impossible at that time to check the water content of this reclaimed primer. It was thought, however, that the water content was somewhat less than 5%. Spray and dip coatings of the material showed great promise as to suitability for a protective coating, and study indicated that in all probability it could be re-used as a zinc chromate primer.

A conference between Lockheed and Max Factor representatives disclosed that the latter were very much interested in the proposition of reclaiming the sludge and rendering it suitable for further use. They had the equipment for doing this work, and because war con-

(Continued on page 40)

A New

DU-LITE *Chemifinish*

BLACK OXIDE ON COPPER ALLOYS

WITHOUT COPPER PLATING

Have you any brass or bronze parts which are difficult or impossible to blacken without plating?

Send us a few samples of the parts and we will oxidize them by means of our new process. They will be returned for your inspection with details of processing procedure. We guarantee you can duplicate the finish in your plant in regular production.

Perhaps the life of the copper oxidizing bath you are now using is too short. Du-Lite can help with this problem.

The new Du-Lite Fact Book should be in your file for reference. Ask for a copy.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONNECTICUT

Specification Item	New Primer	Reclaimed Primer
Appearance	All products satisfactory	No skins, lumps or grit
Odor	Normal	Normal
Wt. per gallon	10.2-lb. per gal. as received	9.9-lb. per gal. as received
Moisture content Toluene distillation 0.4% maximum	0.3%	8.0%
Settling: Primer thinned to spraying viscosity; allowed to stand 24 hours in 100-ml. graduated cylinder	4-ml. pigment settled at bottom. 4-ml. clear liquid at top. All pigment could be redispersed within 30 seconds shaking	(Same as for New Primer)
Stability: Full closed container stored 96 hours at 120° F.	Satisfactory	Satisfactory
Film Properties	Satisfactory	Not as smooth as standard
Working properties	Satisfactory	Somewhat difficult to produce homogenous mixture on thinning
Drying time: Flow-out films; time required to air-dry to handle	3 minutes	2½ minutes
Surface appearance	Satisfactory	Not quite as smooth as standard. Slightly better covering power
Color	Satisfactory	Satisfactory
Flexibility: Flow-out films on 0.020-in. 24ST Alclad panels. Air-dried 5 minutes and baked at 210°F. for 48 hours	Satisfactory	Satisfactory
Metal anchorage	Satisfactory	Satisfactory
Coating anchorage: Spray coat, baked 4 hours at 210°F. Coated with lacquer, lacquer air-dried one hour and baked 16 hours at 210°F.	Satisfactory	Satisfactory
Lacquer resistance primer absorption	Satisfactory	Satisfactory
Water resistance: Flow-out film, air-dried 24 hours, immersed 24 hours in freshly boiled distilled water	Considerable loss of color. Surface satisfactory	Slight loss of color. Surface satisfactory
pH of water before immersion	5.1	5.1
pH of water after immersion	5.1	5.6
Loss of weight per square foot of immersed surface	0.01-gm.	0.013-gm.
Gasoline resistance: Flow-out film, air-dried 48 hours. Immersed in aromatic fuel 48 hours	Color and surface appearance satisfactory	Color and surface appearance satisfactory
Loss of weight per sq. ft. of immersed surface	0.13-gm.	0.07-gm.
Weather resistance (Durability)	Satisfactory	Satisfactory
Pulverized air-dried film; suspended in distilled water of pH 5.6— pH of suspension	5.3	6.2

Table II—How new and reclaimed zinc chromate primers compare in essentials.

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ditions had disrupted normal business they were able to allow otherwise idle men and equipment to participate in the war effort to a full extent. One barrel of the sludge was sent to the Factor plant, along with the data on the process that Lockheed had used in its laboratory formulation.

How It Is Reclaimed by an Outside Concern

Factor found it possible to reclaim the sludge by the following method:

1) The zinc chromate primer sludge, as received from Lockheed, was in wooden barrels under water. The sludge is a semi-plastic mass which contains approximately 75% water. It is taken from the barrel and placed in a draining trough where it is broken into small particles and washed with water. This removes the deflocculating agent (sodium metasilicate, which is water-soluble). The sludge is then taken from the trough, fed into the hopper of a worm extruder, and forced through the aperture of the extruder and between two revolving rolls. During this process the water content is reduced from 75% to approximately 10%.

2) The squeezed dehydrated sludge is next weighed into a 100-gallon special dough mixer. Six hundred pounds of sludge is the charge for a 100-gallon batch of finished reclaimed primer. To this material is added one gallon of normal butyl alcohol and nine gallons of "Aerotol." ("Aerotol" is used as a toluene substitute.) The mixer is closed and allowed to run for approximately 30 minutes. At this point considerable heat is evolved and it is necessary to cool the mixer by means of a water jacket. The mix is allowed to stand overnight; then the remainder of the Aerotol necessary to complete the batch is added in increments of 65-lbs., with mixing after each addition, until a total of 300-lbs. of solvent has been added. The batch is given final agitation and at this point should have a consistency about that of packaged primer, as received from the vendor of new zinc chromate.

Table I gives the composition of reclaimed primer in accordance with a Lockheed material specification.

Item	Percent By Weight min.	max.
Product		
Non-Volatile	50	...
Volatile	...	50
Non-Volatile		
Vehicle	50	65
Pigment	45	50
Volatile		
Hydrocarbon Solvents	92	...
Water	...	8
Vehicle		
Resins and Oils	100	...
Pigments		
Zinc Chromate	75	...
Extender	...	25

Table I—Composition of Reclaimed Zinc Chromate Primer.

The pigment shows, by analysis, the following:

Zinc (Calculated as ZnO).....32% Min.
Chromium (Calculated as CrO_3) .....30% Min.

Preliminary tests as to comparability of reclaimed primer with new primer had been checked before consideration of reclaiming on a commercial scale, and had proven satisfactory. However, the primer received from Max Factor & Co. was tested in comparison with new zinc chromate primer, with results as shown in Table II (see page 38).

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strips off dirt and oil . . . speeds up output

Don't let slow, costly metal cleaning operations "bog down" production in your plant. Follow the example of this ordnance manufacturer whose output of vital parts began to slump due to faulty cleaning.

Dirty, oily film clung to parts after cleaning with competitive material. Also, the long drying time between washing and the next operation slowed up production of vital parts.

Troubles disappeared when a Sun Engineer suggested a switch to Sun Spirits. Parts now are sparkling clean without spots or dirty film and Sun Spirits dried quicker . . . raised output . . . lowered costs.

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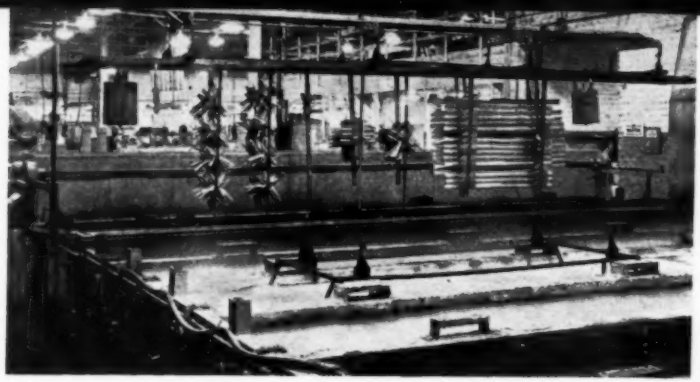

An efficient set-up for anodizing aluminum. Notice the five tanks in foreground, side by side. The one farthest away (No. 1) contains the alkaline cleaner; No. 2 is a rinse tank; No. 3 holds the anodic solution; No. 4 is the final rinse bath. No. 5 (the one nearest you) contains a chromic acid dip solution for surface-treating the cladded alloys. A rack loaded with parts to be anodized is suspended above the first rinse tank. Douglas Aircraft Co.

Anodizing Aluminum

(THEORY AND APPLICATION)

BY GILBERT C. CLOSE

ANODIZING IS THE NAME commonly applied to the various anodic processes employed in the surface treatment of aluminum and the many aluminum alloys. *The purpose of anodizing is to increase corrosion resistance, and to prepare a better bonding surface for subsequent finishing.* The value of anodizing has been established beyond any shadow of doubt, and anyone using or contemplating the use of aluminum will do well to investigate thoroughly all possibilities of applying this treatment to his own products.

The anodic coatings are of optimum efficiency from the standpoint of protection and as a base for subsequent paint coatings. They are of a hard, corundum-like composition, offer extreme resistance to chemical decomposition, exhibit high dielectric strength, yet at the same time will readily absorb various dies and mineral pigments.

Characteristics of the Anodic Film

Some controversy exists as to the actual composition of the anodic film. Certain investigators claim it to be pure aluminum oxide in the gamma form; others hold out that the film is of an aluminum hydroxide composition. Practical evidence, however, favors the opinion that a hydroxide is formed during actual processing, which reverts to a true oxide once the aluminum has been removed from the anodic solution and exposed to the air. This later theory would explain the in-

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itial softness of the coating directly following treatment and subsequent transformation to a hard, inert surface.

Anodic treatments are peculiar in that the reaction that occurs is exactly opposite to the reaction occurring during other electrolytic processes. The work is attached to the anode rather than the cathode, thus the designating term "anodic". In electroplating, a dissimilar metal is deposited progressively on the surface being plated; during anodizing, the surface of the aluminum suffers the initial breakdown; then the oxidation moves progressively deeper. The depth of oxidation is controlled within limits by the time-cycle of the process.

The initial oxide coating formed during primary stages of treatment is porous enough to permit passage of the electrical current. But as the coating becomes heavier, its high dielectric qualities interfere with current passage. Thus an end-point is reached where oxidation ceases to occur. During practical application, the anodizing treatment is terminated before this end-point is reached. This eliminates the possibility of unequal film thickness over different portions of the material.

So far we have spoken of the "anodic processes." Theoretically a great number of such processes exist, dependent upon the type of electrolyte employed. Aluminum may be oxidized in any electrolyte which contains oxygen in the anion and is itself in its highest stable state of oxidation. The acid ion is not changed during the reaction, but acts only as an intermediate oxygen carrier. Different electrolytes, however, will impart different physical characteristics to the anodic film.

In America, the sulphuric acid and chromic acid electrolytic solutions are in most common use. Each has its advantages. A complete comparison of the processes is given in Table I (see page 46).

Sulphuric-Anodic Process; "Alumilite" Treatment Patented

The sulphuric-anodic process, more commonly known as the "Alumilite" treatment, is a patented process and therefore somewhat restricted in use. The chief disadvantage of the *alumilite* treatment is the highly corrosive acid employed. This engenders more danger to operators and necessitates greater care in handling than is required with the chromic acid process. On the other hand, the *alumilite* treatment is subject to wide control by application of different voltages, and by varying the concentration of the solution. Coatings may be produced that vary from a soft, highly absorptive film, to one that is extremely hard and wear-resistant.

Chromic-Anodic Process; No Patent Restrictions

The chromic-anodic process, unhindered by patent restrictions and more desirable from the standpoint of personnel safety, is much more widely employed than the sulphuric acid process. Therefore the remainder of this article will deal exclusively with the cromic-anodic process.

The ideal setup for anodizing consists of four tanks arranged side by side; racks and an overhead track for mounting and handling the work; a DC power supply system; and appropriate voltage and current controls. Capacity of the equipment will depend upon the size of the parts to be anodized and the volume of production. *(To page 46)*

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Features Compared	Sulphuric Process (Alumilite)*	Chromic Process
Electrolyte	Sulphuric acid and water	Chromic acid and water
Solution concentration	May be varied to produce different results. 1. Hard, durable; or 2. Colored, decorative; or 3. Soft, flexible film	5% to 10%
Voltage required	Depends on the concentration	5 to 7 minutes for 0 to 40 volts. 30 minutes at 40 volts
Time	Variable	35 to 37 minutes
Current density	12 to 13 amps. per sq. ft.	1½ to 2 amps. per sq. ft.**
Solution Temp.	68° to 85° F. depending on results desired	95° F., plus or minus 4° F.
Tank material	Lead lined	Steel plate; wood battens for insulation
Rinse required	Cold and hot	One hot
Film thickness	.0004-in. to .0008-in., depending on length of treatment	Very thin
Work racks and clamps	Aluminum only	Aluminum only
Film conductivity	Non-conductive after sealing	Non-conductive
Solution throwing power	Satisfactory	Good

* Patented process.
** Minimum. May run higher with rough material.

Table I—Comparison of sulphuric acid and chromic acid processes as to features.

The tank for holding the chromic acid solution should be of steel plate construction, and insulated with wood battens (preferably fir) to keep the work from contacting the bottom or sides, thus producing a short circuit. Also, a means of heating the solution tank will have to be provided. Gas fire and steam coils are two methods commonly employed.

Typical Setup for Practical Anodizing

The cleaner tank and two rinse tanks may be of any material commonly recommended for this purpose. Arrangement of the cleaner tank and rinse tanks, in conjunction with the solution tank, is shown in Fig. 1 (see page 48).

All portions of the racks and clamps for holding the work that will be immersed in the solution during the treatment, should be of aluminum alloy construction. No. 17S (Alcoa designation number) alloy is recommended, as it not only offers great strength but has higher surface resistance and will cause less current loss during treatment.

The clamps for holding the work should preferably be of the spring-coil type, with sufficient tension to assure positive contact at all times. A loose clamp will result in one of two things: Either the work will become anodized between the clamp and material, thus reducing the electrical contact, or an arc will result that will burn and destroy the work.

Both clamps and racks will become anodized along with the work. It becomes necessary to strip this anodic coating when conductivity is affected. Filing the contact areas

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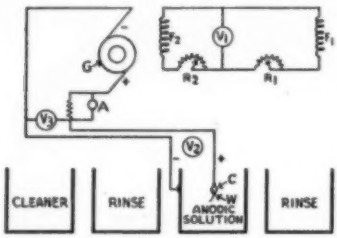

Fig. 1—Schematic layout for typical anodic setup.

F_1—Field Exciter.
F_2—Field Generator.
R_1—Exciter field rheostat.
R_2—Generator field rheostat.
V_1—Exciter voltmeter.
V_2—Non-recording DC voltmeter.
V_3—Recording DC voltmeter
A—DC ammeter.
G—DC power supply (generator).
C—Clamp for holding work.
W—Work (forms anode of circuit).

of the clamps is one method. A more rapid procedure is to immerse the clamps in a 50% nitric acid solution, to which has been added ¼-oz. per gallon of a material comparable to Turco Nitro-Brite. It will be necessary, however, to remove all cadmium-plated screws and steel components from both racks and clamps before immersion in the nitric acid solution.

Power Supply Must Be D.C.; Voltage; Amperage

The power supply for anodizing must be direct current of at least 40 volts with sufficient density to assure a minimum of at least 2-amps. per square foot of material being treated. If direct current is available, appropriate controls will be all that is necessary. Generally, however, an AC-DC generator set is employed. This arrangement, along with necessary voltage and amperage controls, is shown in Fig. 1.

Though 1½ to 2-amps. per square foot is the average current density required, this figure may be considerably exceeded under certain circumstances. The rougher the work, the greater the current consumption. Thus sand-blasted parts, or parts that have received considerable shaping and hammering without subsequent polishing may require up to 6-amps. per square foot. This density, however, should not be exceeded, as burning may result.

Flake-Type Chromic Acid; Strength of Solution

Ordinary commercial flake-type chromic acid of 99% purity is generally used in solution preparation. An average analysis of this type of chromic acid is as follows:

Chromic acid (CrO_3)	99.50% min.
Chlorides (Cl)	0.05% max.
Sulphates (SO_4)	0.10% max.
Insoluble matter	0.10% max.

Naturally, soft water is best for solution preparation. However, most ordinary tap water may be used in the absence of soft water. The ordinary processes for producing soft water from naturally hard water do not remove the sulphates of chlorides, and are therefore useless from the standpoint of anodic solution preparation.

The initial concentration of the chromic acid solution should be between 5% and 10% of chromic acid (6.7 to 13.4-oz. per gallon). Although the chromic acid is not consumed by the anodic process, a solution breakdown occurs, making necessary frequent addition to maintain current density.

Two products result from this solution breakdown; one, aluminum dichromate, neither helps nor hinders the process, but acts to withdraw free chromic acid from the

(Continued on page 52)

The LINK Navigation Trainer

One of many war devices finished with

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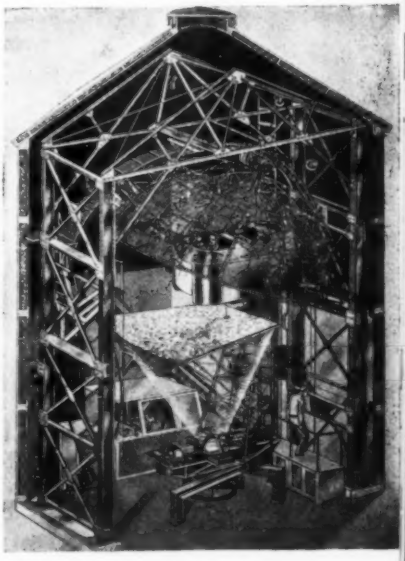

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solution. The second product, chromium dichromate, is produced when free chromium is produced electrolytically, then reacts with the solution to form the dichromate. Here again the only objection is a removal of free chromic acid from the solution. There is no known practical method of removing either product from the electrolyte. The cheapest method is to discard old electrolyte and prepare new when revivifying additions become excessive.

Laboratory Analysis Helps Keep Solution at Strength

Laboratory analysis is the one certain method of assuring maintenance of optimum solution strength. Such an analysis should cover in order of their importance: 1) free chromic acid; 2) chlorides; 3) sulphates; 4) total bases: aluminum, trivalent chromium, and iron; 5) hexavalent chromium. Chromic acid is the most important factor, though chlorides and sulphates should not be excessive.

The pH meter, employing a glass electrode and calomel half cell, provides a convenient method for determining free chromic acid content. Titration is a second method often employed. A very close estimate as to the amount of free chromic acid present may be made by measuring the conductivity of the solution. The Solubridge is an inexpensive and efficient instrument for this purpose.

The chromic-anodic solution should be held as near as possible to 95°F. during treatment. Variances of plus or minus 40°F. will not, however, greatly affect the results. Constant temperature throughout the solution is best assured by agitation. Air released through perforated pipes near the bottom of the solution tank is a common method of agitation.

Time Required for Proper Anodizing

The time required for anodizing is approximately 38 to 40 minutes. After cleaning and rinsing, the work is immersed in the solution, and the voltage is stepped up at a rate not exceeding five volts increase per minute. This gradual increase in voltage should be maintained until a potential of 40 volts is reached. Once the 40-volt level has been established, the work should be treated for an additional 30 minutes, then removed, rinsed, and dried. A final hot rinse will greatly expedite drying of the material.

Anodized aluminum should be handled carefully to prevent rupture of the anodic coating and to prevent soil. Parts should be primed as soon as possible after anodizing. When parts become unavoidably soiled, the dirt may be wiped away with a rag saturated with wash thinner or carbon tetrachloride. The usual personnel safety measure should be rigidly observed when carbon tetrachloride is used.

Further Facts About Anodizing Process

Aluminum in contact with dissimilar metals such as steel, brass, or copper cannot be successfully anodized. Anodizing should precede the installation of dissimilar metal inserts. Aluminum alloys of different composition may be anodized while in contact; also, welded or riveted aluminum parts may be treated.

The anodic process has negligible effect on the physical properties of aluminum. Tensile strength

is not altered. The weight of the part is slightly reduced, but this loss is so small that it is of scientific interest only. Careful measurements indicate that the loss is in the neighborhood of .001 to .004-oz. per square foot of material surface. Severe bending of anodized material will not cause the anodic coating to flake, but will produce minute fissures through which corrosive agencies may attack the metal.

The wrought alloys and all the casting alloys may be anodized, with the exception of cast alloys containing higher than 5% of copper. There is some question as to the value of anodizing pure aluminum, or the aluminum alloys cladded with pure aluminum. The large aircraft companies have resorted to a simple chromic acid dip procedure for this class of material. The chromic acid dip produces a slightly etched surface, and improves the bonding surface for subsequent painting operations.

The best argument in favor of anodizing is the wide acceptance of the process by companies with years of experience in dealing with the aluminum alloys. This experience is backed, not only by laboratory tests, but by service records that greatly favor anodizing both as a protective measure and as insurance for the adhesion and longevity of subsequently applied organic coats.

Despatch Oven Moves Into New Office Building

Expansion of manufacturing made it necessary for the Despatch Oven Co., Minneapolis 14, Minn., to provide a separate building for its offices. Accordingly, a new modern windowless fireproof-type of one-story building 70x80-ft. was built and equipped with the latest facilities for lighting, heating and ventilation. The building is air-conditioned and fitted with fluorescent lighting fixtures which are set into deep troughs to eliminate eye strain.

The air-conditioning system filters the air, and a water-wash system, complete with refrigeration coils and heating coils, provides a healthy working atmosphere.

Outside, landscaping adds to the attractiveness of the building. Alongside of the office is a large parking lot for all employees.

The new office building materially increases the efficiency of the entire office organization, and it will result in much improved service to the firm's many customers and friends throughout the world.

Two Arco Co. Appointments

Appointment of Dr. Eugene W. Kanning as director of research, and Dr. Robert J. Hartman as director of the Industrial division, of The Arco Co., Cleveland, Ohio, manufacturer of automotive, industrial and special infra-red reflecting paints, is announced. Both men have been associated with the Dow Chemical Co. Dr. Kanning was a research chemist in charge of new product development for textiles and leathers. Dr. Hartman was head of technical service and development work on paints, inks and rubbers.

R. J. Hartman E. W. Kanning

Kam N. Kathju continues as Arco's technical director.

Dr. Hartman and Dr. Kanning both hold bachelors', masters' and doctors' degrees from Indiana University, where they served on the chemical faculty together from 1929 until 1942, when they resigned from associate professorships to join Dow. Each is the author of many technical papers.

The famous Goodyear-built Vought Corsair FG-1 used by Navy and Marine pilots in the South Pacific and also by the air arm of the British Royal Navy. Goodyear Aircraft pridefully delivered its first Corsair to the Navy May 1, 1943, less than one year after ground was broken for the building. It has since delivered over 2000 others.

At the Goodyear Aircraft plant in Akron, Ohio, Navy's Corsair fighters must roll out on schedule. Quality finishing at wartime speed is always a prime consideration. Maneuvering these big brutes in a spray booth represented quite a problem in itself. But there were many other angles to consider, such as shadowless lighting, humidity and temperature control, exhausting paint-spray and fumes to reduce the fire and health hazard, air-filtering to exclude dust, and so on.

Binks engineers, working with Goodyear and Navy engineers, met all these requirements by the construction of a Dynaprecipitor water-wash spray booth (shown above), large enough to accommodate the plane.

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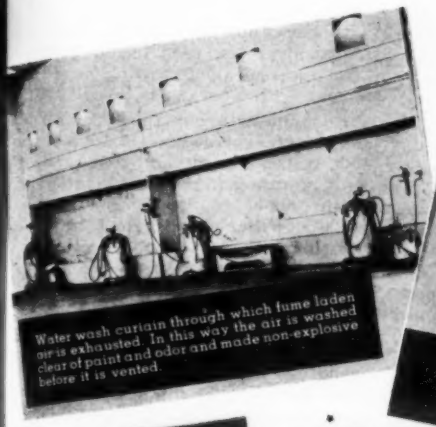
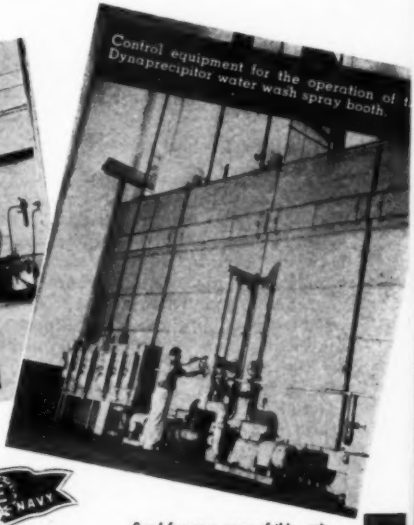
See your nearest Binks engineer for information and advice in connection with your finishing problems,—and for a complete description of Binks spray painting equipment and accessories, write for our new catalog-data book which is yours for the asking.



Water wash curtain through which fume laden air is exhausted. In this way the air is washed clear of paint and odor and made non-explosive before it is vented.



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Synopsis On Alkyds

Paint chemist explains just what alkyd resins are, reveals what other resins, oils and solvents can be used with them to make quality protective coatings, and emphasizes how important it is to follow your paint suppliers' directions and recommendations.

BY KORT JOHNSEN

ALKYD RESINS ARE IMPORTANT and widely used in the field of industrial finishes. They comprise a large proportion, if not all, of the vehicle in many air-drying and baking finishes. This fact has become apparent to most finishing men, as they are forced to take substitutes for materials they formerly used but which are not now available because of the restrictions on the use of alkyd resins. These resins have, in a sense, approached the status of being a universal resin because of their widespread use, not only in synthetics but lacquers as well.

How Alkyd Resins Are Produced

In general, these resins are produced by means of a chemical reaction at an elevated temperature between certain higher alcohols (polyhydric alcohols) and anhydrous acids (polybasic acids). The product thus obtained is a resinous material which is usually modified by the addition of natural resins, oils or phenolic resins because of brittleness and poor adhesion qualities found in the unmodified product. In addition, solvents are usually added at the end of the chemical reaction to maintain the resin in liquid form after it cools to room temperature. It is thus seen that alkyd solutions are very often similar to varnishes, in that they contain resin, oil and solvent.

In past years glycerine was the most widely used polyhydric alcohol, although considerable work has been done recently toward the utilization of other higher alcohols such as certain glycols, pentaerythritol, mannitol and sorbitol. Phthalic anhydride has been the most prominent polybasic acid, with increasing amounts of maleic anhydride being used in the past few years along with lesser amounts of other acids.

In manufacturing these resins, the general procedure is to heat the respective alcohol and acid with agitation in a closed reaction kettle made of a non-corrosive metal. Water formed during the course of the reaction is rapidly boiled away because of the temperature maintained during the reaction. At the completion of the reaction, the resinous product is cooled somewhat and suitable solvents are introduced to enable the manufacturer to filter the resin and also to make it easier to handle in the process of using it in the manufacture of paint.

In some cases, however, the hot resin is merely run into drums, there to solidify and harden. If

modifying agents are to be used, they are added during the course of the reaction. The resin thus obtained is a thermosetting transparent resin with a yellow color which varies with different manufacturing procedures.

What Solvents Can Be Used With Alkyds

Unmodified alkyds are, for the most part, insoluble in coal tar or petroleum solvents, but are soluble in alcohols and alcohol-ether types of solvents such as Cellosolve. Most of the other resins and oils used in paint manufacture are incompatible with unmodified alkyds and, since they are usually brittle, these unmodified resins find only limited use.

The addition of modifying agents to alkyd resins makes the resin much more soluble so that coal-tar solvents and sometimes petroleum solvents may be used with them. Modified alkyds are usually classified according to the type of modifying agent used since this determines, to a great extent, the character or quality of the resultant resin. Thus we may classify the various types of alkyds roughly as:

A) Natural Resin Modified
B) Phenol Modified
C) Oil Modified
  1) Drying type oils
  2) Non-drying type oils

These modified alkyd resins are generally insoluble in alcohols but they show a marked decrease in viscosity when small amounts of butanol are included in the solvent used. Thus the inclusion of butanol in the reducing solvent provides a good method of obtaining relatively high solid content at spray weight.

Let us consider, then, the various types of alkyds just mentioned. When natural resins, such as rosin, are used to modify alkyd resins, a hard brittle resin is obtained that has a comparatively high melting point and fast solvent release. Natural resin modified alkyds are compatible with nitrocellulose or lacquer plasticizers and are, therefore, useful in making sanding sealers and lacquers for interior use. However, their lack of touchness and durability make them unsuitable for use in lacquers that are likely to encounter outside exposure.

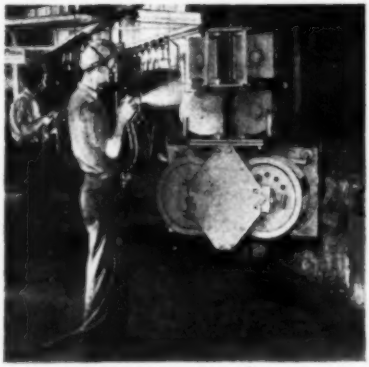
Phenol (carbolic acid) and phenol-formaldehyde resins are sometimes used as modifying agents to obtain better water resistance and hardness, but at the expense of slightly darker color as compared to other types of alkyds. Because of this, phenol modification is generally used in conjunction with drying-oil modifiers and a compromise resin is thus obtained which has a wide range of usefulness.

Drying and Non-Drying Oils as Alkyd Modifiers

The use of drying and non-drying oils is the most common method of modifying alkyd resins. The value of using a drying oil lies in its ability to air dry to tough durable films. Linseed, tung, soya bean, dehydrated castor, oiticica and perilla oils possess this property and are used extensively in alkyd manufacture. There seems to be some disagreement, at the present time, as to the exact mechanism involved in the drying of these oils but, in general, it seems to be a complex combination of polymerization and oxidation (taking on oxygen from the atmosphere).

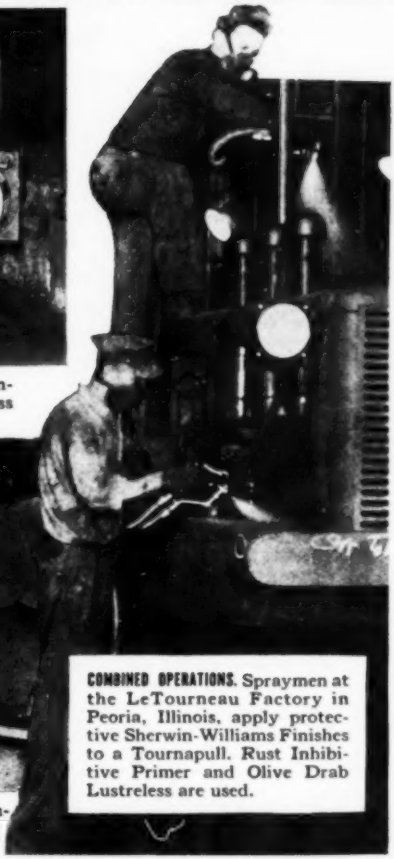
Oils that do not have the ability to take on oxygen or to polymerize readily because of their particular

DEFENSE



SPRAYING COMPLETED PCU's with Sherwin-Williams Olive Drab Lustreless Enamel.

PARTS ARE DIP-PAINTED with Sherwin-Williams Rust Inhibitive Primer.



COMBINED OPERATIONS. Spraymen at the LeTourneau Factory in Peoria, Illinois, apply protective Sherwin-Williams Finishes to a Tournapull. Rust Inhibitive Primer and Olive Drab Lustreless are used.

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OUT IN FRONT! LeTourneau units like this keep clearing roads for the Army. Sherwin-Williams Finishes protect them from rust, help screen them from prying enemy eyes!

Photographs Courtesy R. G. LeTourneau Inc., Peoria, Ill. and Stockton, Cal.

LeTourneau uses SHERWIN-WILLIAMS Finishes for Protection in Action!

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Sherwin-Williams industrial finishing "know-how" that has served LeTourneau so well for so many years is at *your* service. Write The Sherwin-Williams Company, Cleveland 1, O.

INDUSTRIAL FINISHES

chemical structure do not harden to tough films and are known as non-drying oils. Raw castor oil, cottonseed oil and cocoanut oil are examples of non-drying oils. In the case of both drying and non-drying oil modification, the choice of oil used is of great importance since the characteristics of the oil used are imparted strongly to the finished resin.

Solubilities of oil-modified alkyds require careful study before using since many resins, especially those of low oil content, will not tolerate petroleum solvents but require either hydrogenated napthas or coal-tar solvents. It thus follows that finishing men should be conscientious in following recommendations of paint manufacturers in choosing a reducing solvent.

Characteristics of Coatings Made of Modified Alkyds

Alkyd resins modified with drying oils are, in many cases, the sole vehicle in clear or pigmented coatings, driers being added in some cases to improve air drying qualities. These coatings have excellent durability, gloss retention, humidity resistance and electrical resistance, along with good spraying properties. The best weathering qualities are found in resins containing larger quantities of oil. These various qualities have enabled manufacturers to use alkyd-based finishes on a widely diversified line of items such as transportation equipment, farm implements, wire coatings, machine tools, marine finishes, printing inks, toys, golf balls, etc.

Alkyds modified with drying oils can also be used to advantage in conjunction with lacquer coatings since these resins will, of themselves, dry to hard films. It has been found that this greatly improves the quality of lacquers, being most apparent in lacquers that have to withstand outdoor exposure.

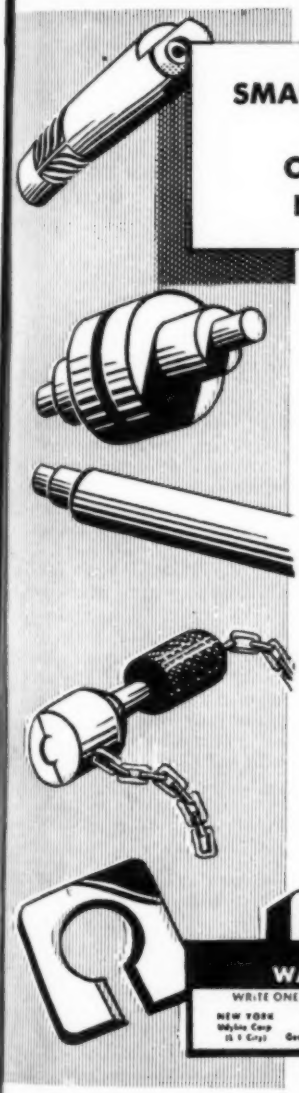
Alkyd resins modified with non-drying oils are used mainly in the role of plasticizing resins for urea-formaldehyde resins and nitrocellulose lacquers. They are also used occasionally as plasticizers for drying oil modified alkyds of low oil content. It has been found that plasticizing in this manner is superior to using oils or chemical plasticizers alone.

Blends of non-drying oil modified alkyds with urea-formaldehyde resins are used extensively in hard durable finishes suitable for washing machines and ice boxes. However, these finishes have to be baked to obtain the maximum durability offered by such a combination.

It can be readily seen by the above enumeration of qualities and uses of alkyd resins that the current restrictions on the use of alkyd resins by paint manufacturers has curtailed their use of a very desirable raw material. However, we may look forward to the peace days to come, with assurances that new and better alkyd resins will be available for more durable finishes. Until then let's give the paint manufacturer the best cooperation we can in overcoming the obstacle of using substitute raw materials.

Hercules Subsidiary in England

Hercules Powder Co. announces that it has created a subsidiary, Hercules Powder Co., Ltd., for the distribution of technical information on its chemical products in Great Britain and Eire. The company will have offices at 140 Park Lane, London, and will be under the direction of Cornelius H. B. Rutteman, managing director.



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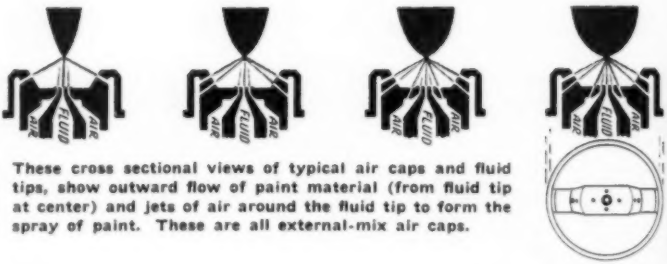
Spray Gun Air Caps



These cross sectional views of typical air caps and fluid tips, show outward flow of paint material (from fluid tip at center) and jets of air around the fluid tip to form the spray of paint. These are all external-mix air caps.

BY PETER P. WOOD

THE AIR CAP (often referred to as the nozzle) on your spray gun has more to do with the kind of spray painting job you get than is commonly realized. This one little accessory—depending upon its suitability for the work, its adjustment and condition, and the air pressure used—can help the poorest quality paint material, or it can ruin the best paint material used for spray painting a part or product.

Air caps are made to much closer precision than average machine work. To give you some idea about their manufacture: The blank cap is first machined and ground at contact points of the fluid tip. This gives alignment. It is then placed on a jig with various positions for any two opposite holes in the cap. A super sensitive high-speed drill is employed to drill the small holes. After these holes are drilled the cap and jig, which is also a surface block, are removed to a surface plate. At the surface plate a 2-in. mandrel is placed in the hole and gage-checked between the surface plate and the mandrel from 1-in. to 2-in. from the hole. This is done on both holes and is repeated for every pair of holes in the cap. When finished, the part is more accurately made than a micrometer.

The reason for such close manufacturing is because no spray gun is any better than its air-cap and fluid-tip combination. Each cap is made to operate only over certain fluid tip or fluid nozzle sizes. The manufacturer has gone to great lengths to determine the size (diameter) of paint stream and volume (fluid tank pressure) of paint for each cap. Variation from his recommendations only leads to trouble of one kind or another. This, in turn, results in inferior work, waste of paint or waste of time taken to clean the air cap.

Variety of Air Caps Available for Different Work

Many different caps are made for the numerous varieties of paint materials used and the various spray-painting jobs to be performed. Because there are so many, I think the most satisfactory way to determine the proper com-

(Continued on page 67)

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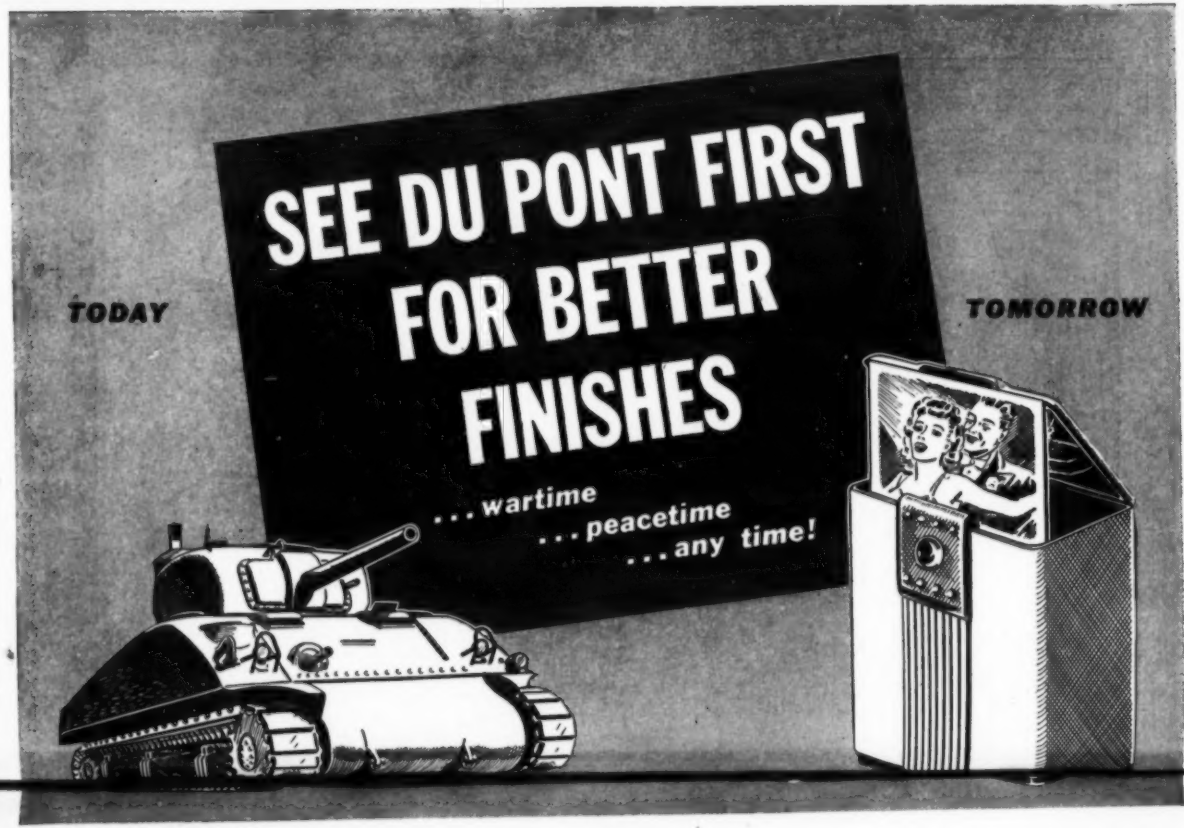
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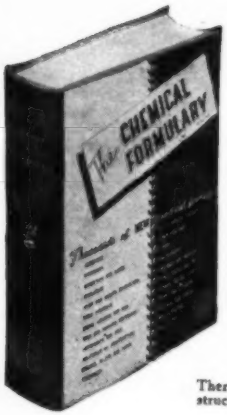

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INDUSTRIAL FINISHING Magazine

1142 North Meridian Street **Indianapolis 4, Ind.**

bination and pressures is to consult the equipment manufacturer.

Each air cap has definite characterstics built into it. Take, for instance, the 3-hole cap. This cap has a center hole which fits over the fluid tip, and one hole in each horn. Some 3-hole air caps are still in use, but now many of these are now considered to be out-of-date.

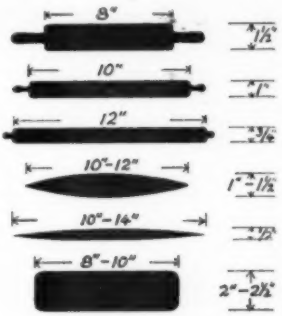
When using a 3-hole air cap the atomizing air pressure should not exceed 50-lbs. per square inch. Above 50-lbs. air pressure, the spray pattern will be split, due to the force of the two horn jets coming together.

The pattern of this type of cap is narrow to medium width (lengthwise) by about 1-in. to 1½-in. through. It has a rather heavy driving force (from gun to surface). The poorest atomization is at the ends of the pattern in width, while the best atomization is at and near the center. From this you can see that it is not especially desirable for fine quality work.

Air Caps That Have 5, 7, 9 or More Holes

The next development was the 5-hole cap which has two holes in each horn of the cap—usually one large and one small hole. The small hole is included to "soften" the forceful contact of the two larger holes at their point of contact. This "softening" action makes possible the use of atomizing pressures higher than 50-lbs., without splitting the pattern. It also has a tendency to give better control and distribution of the finishing materials throughout the spray pattern. The spray patterns are usually a little wider, with a little less driving force.

In the 7-hole air cap there is added a pair of holes through



PATTERN SHAPES

A few of the approximate pattern shapes produced by older type and later type spray guns.

which air flows from the center chamber of the cap. These air jets also help to soften the impact of air at the same junction point of the holes in the horn. The 7-hole air cap produces better atomization at lower pressures, with less waste of paint and better control of the spray patterns. The spray patterns could be widened and narrowed with more even distribution of materials. However, if high atomizing pressures are used (70, 80 or 90-lbs.) the overspray is increased, which results in greater loss of paint.

The 9-hole air cap gives us something entirely different. In this cap two sharply-angled holes drive at the fluid column just beyond the fluid tip, splitting the column evenly. Then two holes are placed at a lesser angle, positioned so as to envelope the two sides of the split column and drive it back at right angles to a point where the jets in the horn give the final distribution. This cap can be used for the heavy-viscosity materials and to break up materials

having high molecular qualities. The 9-hole cap will give excellent atomization at low pressures on ordinary materials that show readings of 28 to 30 seconds on a Ford cup; but if used with high pressure, serious overspray is created which, in turn, causes a serious loss of paint.

The 13-hole air cap and others are only variations of those previously described. Each one has been developed to make various widths and depths of spray paterns.

Slightest Damage to Hole or Adjoining Surfaces Causes . . . .

In an air cap each hole, including the center hole, is dependent upon the other for satisfactory spraying. The slightest burr or scratch on the face of the cap at the hole will cause a change of spray pattern which means a change in the distribution of sprayed paint. Care should be taken to see that the air cap is never bumped against anything. If an air cap is struck or bumped by something hard, or if it is dropped on a hard floor, making an indentation in the horn, you can bet that the hole in that horn has been flattened to a slight oval shape and that the jet of air is no longer aligned with the corresponding jet from the other horn.

Never use wire of any kind to clean the jet holes. Never scrape the face of the cap with a metal knife or tool. Do not use a hard bristle brush or steel brush on the face of the cap, as this destroys the original contour of the jet holes at the face of the cap; it removes the sharp edges at the face of the cap and thereby destroys the direction of air flow. Only clean solvent, wooden toothpicks or wooden splinters and soft brushes should be used to clean air caps.

The cost of a new air cap is comparatively small. In fact I believe you receive more dollar value when you buy a new air cap than in the purchase of any other part of your spray equipment. But the air cap can also be the most expensive thing in your paint department if it is not well chosen and kept in perfect condition. A damaged air cap will cause poor spray-painting workmanship, rejects, wasted paint, and high maintenance cost in and around the spray booth. Also, where you find high maintenance cost you will find a bad fire hazard.

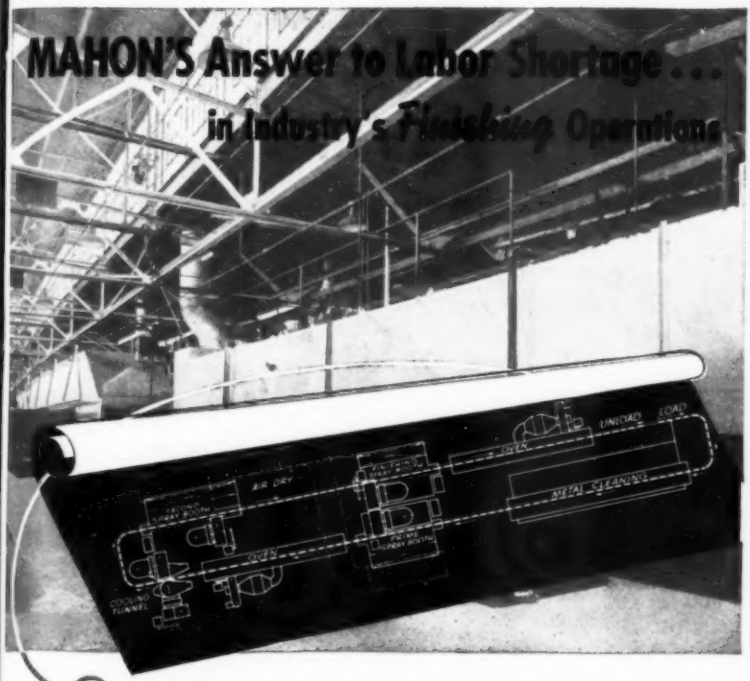
Fluid Tips Important Too

While the air cap is most important, the fluid tip behind it can be equally as troublesome if it isn't perfect. Fluid tips are made with various inner and outer diameters. The inner diameter has to do with the fluid column, while the outer diameter has to do with the air surrounding the fluid column after it leaves the fluid tip. Too large a column of fluid is just as bad as too much air or not enough air. There is a point at which the design and adjustment are just right.

The inner diameter of fluid tips, from the smallest size up, ranges about like this: .010, .020, .040, .050, .070, .080-in., and up to as much as ½-in. With any given air cap you would expect that the smaller the column of fluid the higher the atomization. This is true, but where the usual trouble lies is that too many spray operators generally want a larger column at low fluid pressure, rather than a small column with higher fluid pressure. When the fluid column gets too large for the small atomizing jets to fully envelope it, then the paint gets

(Continued on page 72)

MAHON'S Answer to Labor Shortage . . .
in Industry's Finishing Operations



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Shortage of skilled labor is the most vital problem confronting industry today—a problem that is constantly growing more acute as the demands of our fighting forces absorb additional men.

In the Finishing Departments of many war production plants, Mahon engineers have accomplished some exceptional results toward combating this labor shortage. Increased production with decreased manpower is continually being achieved by the institution of more modern finishing methods—by revision and re-arrangement of plant and production layouts—by replacing obsolete and inefficient machinery with *faster* and *better* equipment.

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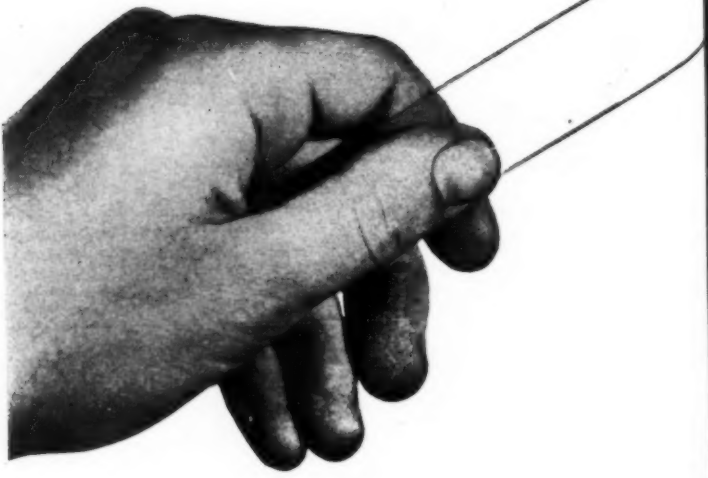

t tape

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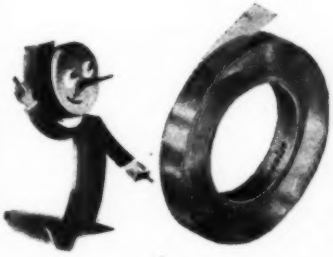

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out of control of the jets, causing dirty caps, bad distribution, poor atomization and, in many cases, poor finished work.

Proper Flow of Paint to Retain Right Solvent Balance

What is wanted when spraying paint is not perfect atomization (you can get this at extremely high pressures) but rather the proper flow of paint to do the work in a given time, plus the proper air cap to distribute the paint evenly over the surface without overspray (or with fog kept down to a minimum), retaining the proper solvent balance in the paint after it reaches the surface, to produce satisfactory results with the paint.

A good paint with good solvent balance can be ruined by using too high an atomizing air pressure, thus evaporating too much of the lighter solvents, and leaving only the "longer" solvents in the material being applied. This "long" solvent, with none of the lighter solvents left in the material after it has been atomized, may leave a good quality paint showing a very poor solvent balance and poor results. Likewise, if a poor cheap paint were being used with the proper air cap, fluid tip, and atomizing pressures, which would put it on the surface in good solvent balance, you can see how it would be possible to do better work with certain cheap paints than the other high quality paints.

Higher Atomizing Air Pressure Evaporates More Solvents

The thing to remember is that when the paint is being atomized, the air evaporates much of the solvents. The higher the atomizing pressure the more solvents are removed, and vice versa. A safe rule to follow is to remove only as little of the solvents as is necessary, so that when the paint hits the surface being painted you have it under control. It won't sag. It will retain enough of its solvent to flow and amalgamate, according to the results required for the parts or surfaces being painted.

AUTHOR'S NOTE: Follow the 12-point program I outlined in my article in December 1944 issue. When everyone understands about the proper selection and use of air caps, the size of fluid tips to use, and the proper setting of atomizing pressures, many gallons of paint will be saved and better spray painting results will be obtained.

A Conveyorized Dip-Coating Operation

A TOUGH waterproof corrosive-resistant coating to protect new spark plugs during storage and shipment, is applied automatically in the plant of the Corcoran Brown Lamp Works, Division of Auto-Lite, Cincinnati, Ohio. When the need for protection has passed, the ethyl-cellulose coating can be easily and quickly removed by slitting it and stripping it from the spark plug.

The special equipment employed could also be used for a dip-painting job. It includes a "plastic coater" wherein the ethyl gasoline cellulose is melted and kept at exactly the correct temperature and condition for the dip-coating job; also a small cross-bar conveyor designed especially for this operation.

Referring to the accompanying illustration, an operator hangs six

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plugs on each cross bar. After being immersed in the dip compartment of the plastic coater, the plugs are returned overhead to the end from which they start. This system permits the uniform dipping of 4500 plugs per hour.

The machine shown in the illustration is capable of dipping spark plugs at the rate of 4500 per hour. Indirect heat is employed. This enables the melting of 100-lbs. of plastic per hour without danger of breaking down the ethyl cellulose by excess heating. Thermostatic control is maintained over both the heat exchange medium and the plastic to insure that neither rises over its maximum allowable temperature. The plastic is melted and preheated to proper temperature for dipping before entering the dip tank section of the unit. Extremely close control (2° F. maximum variation) and uniformity of temperature are achieved with remarkably low heating surface temperature.

The solid plastic is introduced at the loading end of the tank and reduced to liquid at the right hand end of the heating pads. The temperature of the liquid is raised to the dipping temperature by flowing over and between the pads to the left hand end of the unit where it is picked up by a plastic pump immersed in the liquified plastic. The pump delivers the plastic into the dipping compartment at such a rate as will maintain an overflow over a weir [dam] located at the right hand end of the dipping tank. The overflow is reheated by passing under the dipping tank over the reheating section of the heating pads and to the pump again. This plastic movement gives several needed effects as follows:

1) The film which forms on the dip tank surface exposed to the air is continually removed or prevented from forming because the surface is in steady motion in the direction of the weir.

2) Bubbles, which may form in the ethyl cellulose due to the immersion of the part to be dipped, are continuously removed over the weir.

3) The temperature of the plastic at the point of dipping is maintained absolutely uniform, resulting in a standard quality of coating at all times.

4) The level of the dipping surface is maintained without variation, a feature which is necessary for automatic conveyor handling. The weir is adjustable so that the level of the dipping solution may be controlled for various sized parts.

5) Agitation.

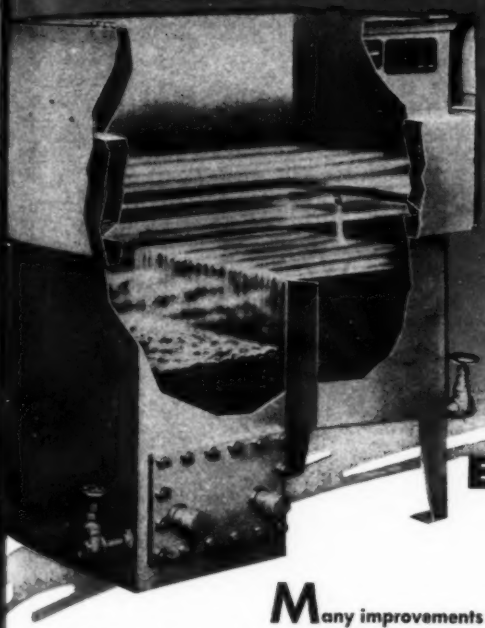
The conveying mechanism is a compact unit, the whole assembly taking up much less floor space than an installation using the wrapping method for an equal production. An overhead return permits a travel time to allow the plugs to cool before packing and requires a minimum of labor, since the persons packing can also remove the coated parts.

Cleaning Solvent Tanks

THE CLEANING or repair of tanks in which organic solvents are used should not be undertaken without rigid precautions, inasmuch as the vapors of all organic solvents are toxic and the majority are flammable as well. Oxygen deficiency in the tank is another hazard which must be considered.

If a tank has contained a flammable solvent, the safest method for removing the vapors, prepara-

ARE YOUR *Degreasers*



AS
MODERN
AND
EFFICIENT
AS YOUR OTHER
PLANT
EQUIPMENT?

Many improvements have been made in Detrex Degreasers during the past few years. Each has contributed to greater efficiency in metal cleaning and to increased economy in the use of degreasing solvents.

In your post-war planning, modernization of your metal cleaning operations will undoubtedly be given as much serious consideration as improvement of other production processes. Right now a Detrex engineer can bring you up to date on the construction and operation of the Detrex cleaning equipment now being produced. He will be glad to acquaint you with all the details which may apply to your particular situation. There's no obligation, of course.

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WAR BONDS

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tory to cleaning or repair, appears to be thorough flushing by steam, followed by mechanical ventilation of a type approved for flammable vapors. Steam jets to loosen sludge have been successful, the tank then being washed, drained and dried out with warm air.

If the use of steam is impractical, the sludge may be washed out with high-pressure hose, but care must be exercised to avoid building up static electricity. Steam also has some disadvantages, such as the building up of combustible mixtures at the vents. Non-sparking shoes and tools, vapor-proof lamps, and protective clothing should be utilized, and otherwise the Code of Flammable Liquids and Gases of the National Fire Protection Association should be observed.

Before cleaning a tank that has contained a non-flammable solvent, the concentration of vapor in the tank should be reduced as much as possible, preferably by mechanical ventilation.

The cleaning of any tank that has contained an organic solvent should be done from outside the tank, if possible. In degreasing processes utilizing non-flammable solvents, where the process is wholly or substantially enclosed, metal chips, mud, and other solid residues are usually removed by scraping, and a clean-out door is generally provided through which the sludge may be removed by a long-handled scraper. The liquid residue and sludge are immediately confined, to lessen volatilization of the solvent in the atmosphere. An approved canister type gas mask is advisable.

Whether the tank is cleaned from the inside or outside, however, workmen in the surrounding area also should be protected from the possibility of vapor inhalation or the outbreak of fire. All organic vapors are heavier than air and tend to settle in low places, so that the atmosphere may be practically free of vapors at breathing level and yet contain a mixture that is explosive or hazardous to health at or near the floor or in a nearby pit.—*Safety Research Inst.*

Machine and Work Room Colors

WARTIME experience has proved that paint, used to "tone" workshops and factories through scientific application of the various wave lengths of colors, can improve worker morale and boost production.

In the relatively new field of using color a Color Dynamics theory has been developed which is being taught in classes at several colleges and universities. Instead of conventional gray and buff, it substitutes colors with wave lengths which quickly bring to the worker's eye the critical or operating parts of machines, while the less important ones "drop back" but provide a quick rest for the eye.

A green, called "Vista," is advocated as the most restful. It is the color which a person automatically sees upon looking at a fixed point in a field of white after he has gazed for a minute at a point in a field of red.

During the past year hundreds of plants have used the Color Dynamics system, and reports from them tell of reduced accidents, decreased absenteeism and fewer rejected materials, along with increased production and less fatigued workers.

This system is considered a real contribution to the war effort. Its use is increasing daily, and it cer-

Billy Wrinkle
CALLS THE ROLL . .
of typical industrial leaders who have used Wrinkle Finish because of its outstanding merit in enhancing the utility, appearance and sales appeal of their products:
National Cash Register Co.
Sheffield Corporation
Veeder-Root, Incorporated
Gilbert Clock Company
Dumore Company
Fed'l Telephone & Radio Corp.
Remington-Rand, Inc.
The Lane-Wells Company
Tuber Instrument Corp.
N. American Philips Co., Inc.
Lanston Monotype Machine Co.
Speed-O-Print Corp.
Diebold Safe & Lock Company
Coleman Lamp & Stove Co.
Pitney-Bowes Postage Meter Co.
American Blower Corp.
Burroughs Adding Machine Co.
Bisbell Machine Co.
Peddinghaus, Incorporated
Wilson Mechanical Instrument Co.
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tainly will be a factor in the post-war homes.

One of the biggest jobs of installing the Color Dynamics system has been at the Consolidated Vultee Aircraft Corp. plants at San Diego, Calif.; Nashville, Tenn., and New Orleans, La. J. M. Druliner, Chief Industrial Engineer of Consolidated at San Diego, gives this analysis of how the system works:

"The morale and efficiency of industrial workers are drastically affected by the physical conditions under which they work. For instance, continued eyestrain leads to nervous tension, causing unnecessary fatigue. Similarly, drab, cheerless surroundings encourage mental depression and make each job seem harder.

"The new color scheme is designed to eliminate such negative factors. It reduces the likelihood of eyestrain and related physical ailments, thus promoting efficiency and morale. All this is particularly important to women, because of good housekeeping habits. But our men workers are benefiting, too, even though many may not consciously realize it. Since the San Diego plants have been redecorated, our records have shown a marked increase in production efficiency along with definite decrease in accidents and absenteeism.

"In accord with the principles of Color Dynamics, our important machine sections are painted in different, but not too widely contrasting, colors; and these guide the workers' eyes to specific points requiring attention. Our walls are painted in 'eye-rest' colors, which do not force the employee to make fatiguing readjustments each time he glances up from his work."—*(From Pittsburgh Plate Glass Co.)*

Stripes 1/2-in. Wide

Author's Note: I have stopped at the Beugler office, thinking that perhaps they might have a bit of news that would be of interest to you, and here is what I came up with. If you wish to use it, give it any title you choose and please edit it, as I must punch it out on the run. I am very busy. By the way, the Beugler Co. does not seem too anxious to turn this information loose, due to their inability to fill orders promptly, but I have their permission to break the news.

MANY CONCERNS in the finishing business have long known the difficulty of being able to purchase striping tools that would produce stripes wider than the conventional narrow sizes which range from 1/64 to 9/32-in. This limitation of sizes has been due to the fact that wide stripes —or rather the machines that will produce them—are very difficult to make.

The trouble is that the wider wheels that roll on the stripe do not distribute the paint evenly. If the face of the wheel is flat, the paint squeezes over the outer edge of the stripe, leaving the center of the stripe almost without coverage. Various types of knurling have been tried without success. Next, hollow grinding or concaving the surface was tried. This was a little better, but the degree of hardness of the surface being striped made it unsatisfactory. If the striping tool worked well on a soft or slightly yielding surface, it would not work well on a hard non-yielding surface, and vice versa.

Boiling down several years of experimenting with various metal alloys and various types of

IS THE WORD FOR ARCO PRODUCTION FINISHES

When trouble comes, folks know they can count on the old-fashioned family doctor to straighten them out. In much the same sense, our customers count on Arco Production Finishes to solve their finishing problems and keep them solved. When you specify Arco, you specify dependability.

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knurling on the striper wheel, striper wheels of ⅜ and ½-in. widths have been produced that seem to be quite satisfactory for the average striping job. It is hardly necessary to mention that these wide stripes are not always as perfect as the narrow stripes. The wider area of the wheel surface is bound to contact more imperfections on the surface being striped.

In checking with the Beugler Mfg. Co., who has developed machines with which to make these wider stripes, I find that the ⅜ and ½-in. wheel heads are doing a satisfactory job for manufacturers of ping-pong and tennis tables, as well as other striping jobs that do not require 100% perfection. I am informed that the two wheel sizes mentioned here, fit the Beugler Jumbo model striper and, while not yet in production, some of them have been furnished on special order.—EVERETT DAMON.

Young Salesman: Our new lacquer is a remarkable material. It has splendid build, flows out perfectly; it's easy to rub, etc., etc.
P. A.: Does your lacquer bloom?
Y. S.: Does our lacquer bloom? Oh man, our lacquer blooms just like the first rose in June.

American Chemical Paint Co. Appoints N. Y. Distributor

Bricker & Andes, 316 Atlantic Ave., Brooklyn, N. Y., has been appointed Sales Agent and Distributor of the inhibitors and metal working chemicals for the American Chemical Paint Co. of Ambler, Pa., to expedite the service and supply these materials to the metal working industries in the New York City Metropolitan area.

The experience of the Technical Service Staff of Bricker & Andes will supplement the cooperation of the American Chemical Paint Co.'s Technical Staff and Laboratories in the solution of chemical metal working problems.

Employment of Handicapped Veterans

With much of the responsibility for the veterans' return to normal life falling upon industry, individual companies today are making plans not only to take back into their organizations those of their own employees who have become disabled but to absorb as many other handicapped service men as possible. Based on the plans of 54 companies, the new report, "The Employment of the Handicapped Veteran," issued by the Policyholders Service Bureau, Metropolitan Life Insurance Co., discusses the determination of company policies, and the procedures and organization for carrying out these policies.

Included in the report are descriptions of the plans of two companies cooperating with the armed forces in teaching the hospitalized veteran an occupational skill which he can master and which will help to rebuild damaged muscles. Several combined plans of community and industry are also discussed.

A copy of this report is available to executives who request it on their business stationery. Address: Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, N. Y.

Heat Resistant Plastic

A new chemical compound from which heat-resistant plastic or synthetic rubber can be made is announced by R. E. Gage, Director of Research and Development of The Mathieson Alkali Works, 60 E. 42nd St., New York 17, N. Y. The new compound, which is known as dichlorostyrene, was developed in the Mathieson research laboratories. It has excellent heat resistance and electrical insulating properties.

Urgent need to save valuable wartime hours and speed up production, leads to another important use for Berry Brothers' Lionoil! This newest time-and-cost-saving comes through the elimination of chipping or grinding off weld spatter.

A thin coat of Lionoil keeps spatter from sticking and eliminates need for costly, time-wasting clean-up.

Lionoil is the ideal material for this purpose. It is equally suitable for gas, electric or spot welding. It has no unpleasant odor and its use is highly economical. *It does not have to be removed.* You can weld right through it! *You can finish right over it!*

One user says, "The time and money we save by cutting out chipping and grinding, makes use of Lionoil practically mandatory."

Lionoil is also widely used to protect castings against rust—to eliminate sand blasting—make machining easier and cleaner—lengthen tool life—simplify cleaning to remove oil and grease before painting casting parts.

Order some Lionoil today for a spatter control test.

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SEE OUR INSERT IN SWEET'S NEW PRODUCT DESIGN FILE

QUALITY FINISHES SINCE 1858

Better Paints for New Civilian Products

GREAT PROGRESS has been made in metal primers and metal paints. The vast research and test programs carried on for the Army and Navy have resulted in greatly improved protective qualities of metal paints.

Fire-retarding paints have been developed to a high degree to meet requirements of the Army and Navy. They will be available for general use on wood, textile and composition surfaces. These coatings have durability as well as fire-retarding properties, and can be used for interior and exterior use.

Developments which have been made in synthetic elastomers now being used for various Army and Navy requirements, will make it possible to produce acid, alkali and chemical resisting coatings for industrial and chemical plants, where these properties are essential. Durability will be combined with chemical resistance.

Fume-proof enamels will be far superior to those of the past.

Insecticidal paints will be available, which will keep the home free from flies, mosquitoes and other insects for probably a year or more. Prolonged tests are now underway. These paints can be made in flat, semi-gloss or gloss and will have all the service qualities of other paints. These paints are not toxic to human beings.

Improved galvanized metal paints will be available which can be used either as one coat or 2-coat jobs. These paints will have excellent adhesion to new galvanized metal. The durability of one coat of this paint will be superior to the 2-coat job of the past.

Recent developments indicate that heat-resisting paints of superior quality will be available which will withstand high temperatures without discoloring, blistering, peeling, etc.

Non-slip paints have been developed for the Navy which should be popular as finishes for floors in industrial plants, public buildings, banks, etc. These may find use as porch and step paints for the home.

Excerpts from a speech made by Mr. Austin O. Allen, Vice-president in Charge of Manufacturing and Research, Vita-Var Corp., Newark, N. J., before the New Jersey Council of Painting and Decorating Contractors of America, on Jan. 11, 1945.

Resin Fabric Coatings

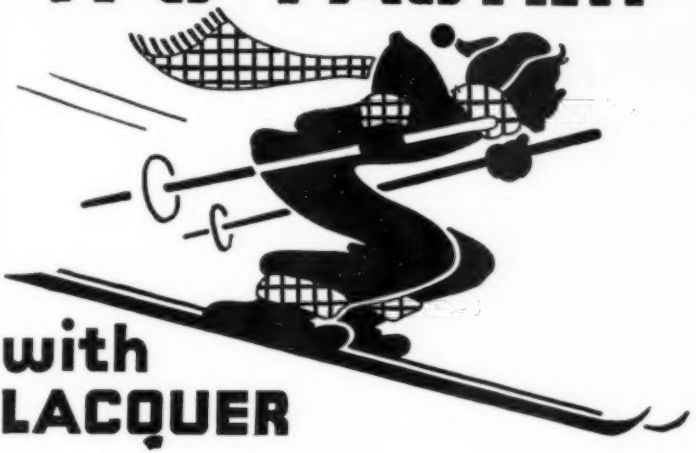
THE POSSIBILITY that newly contrived resin fabric coatings may crowd rubberized fabrics out of the postwar textile picture was suggested recently by Dr. Donald R. Powers of Boston, Director of Textile Research and Development for Monsanto Chemical Co., in an address before the annual meeting of the American Association of Textile Chemists and Colorists.

Under the broad caption of "Resin Fabric Coatings" he grouped several of the new textile treating processes which Monsanto developed in its effort to improve GI fabrics. Effects of the processes, he said, include improved wear resistance, minimized shrinkage, improved tensile strength, decreased "crocking," improved fabric coatings and durable water repellency.

To these, Dr. Powers added an entirely new development by which sub-microscopic specks of silica are deposited on either natural or artificial fibers, explaining that it is one "which we like to think of as a resin." This is Syton.

(Continued on page 86)

IT'S FASTER



with LACQUER

For on-the-dot, high speed production, use lacquer. This general purpose industrial finish is easy to use, dries quickly to a tough, color-fast, durable finish. It saves time and money . . . avoids delayed production schedules . . . requires no special drying or baking equipment.

C.S.C. makes no lacquers or thinners but supplies solvents and plasticizers to manufacturers of protective coatings.

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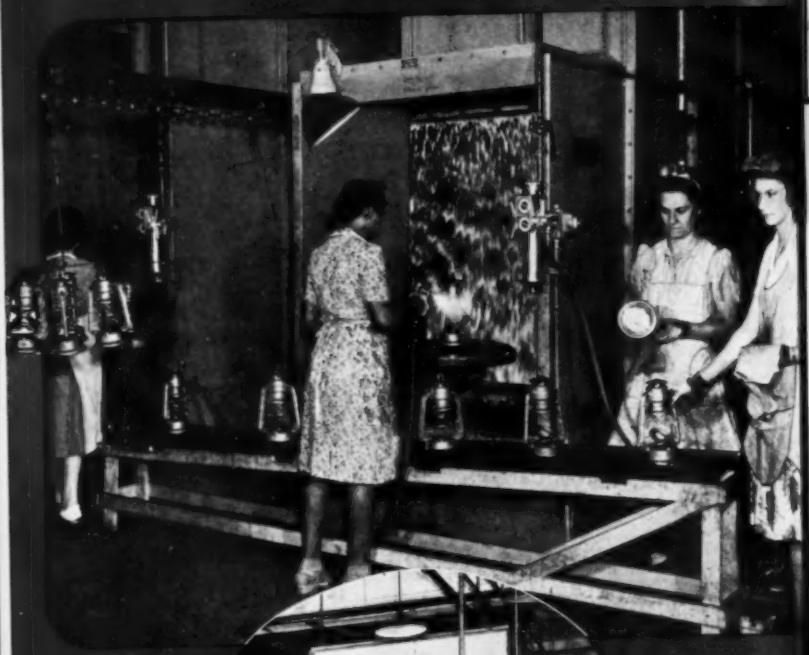

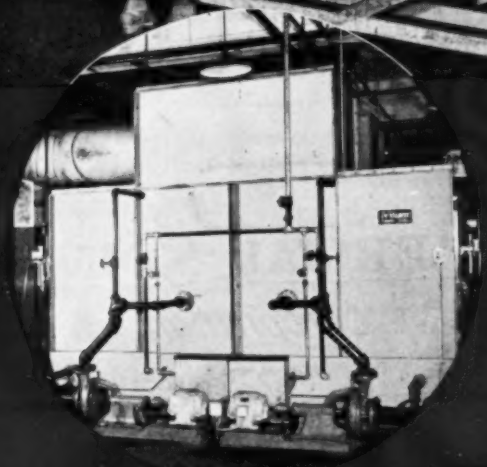

PROGRESS REPORT

on Finishing Speed for Lanterns

DeVilbiss System Breaks a Production Bottleneck

● The step-by-step approach to the solution of a finishing problem at the R. E. Dietz Company, famous lantern manufacturers, may throw some "light" upon a way to speed up your production.

Dietz lanterns had for years been *plated* with tin. But due to wartime conditions, they switched to an organic finishing material applied by the *dipping* process. This method proved to be both slow and messy—reduced efficiency—inflated costs and set up a serious production bottleneck.

Then DeVilbiss engineers were called in for suggestions and the spray method was adopted. Now, with DeVilbiss spray equipment and DeVilbiss water-wash spray booths four spray operators have stepped up finishing speed to break all bottlenecks and produce a better finish.

This is typical of the way wartime developments lead to peacetime production progress. If you have a coating or finishing problem now or in your conversion plans, call a DeVilbiss engineer.

THE DEVILBISS COMPANY • TOLEDO 1, OHIO

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Spray Systems

SPRAY EQUIPMENT • EXHAUST SYSTEMS
AIR COMPRESSORS • HOSE AND CONNECTIONS

"It is best described as an anti-lubricant; a drop of it dries up a surface just as a drop of oil lubricates a surface," said Dr. Powers. "It is not at all an adhesive, yet it acts like an adhesive in many cases by increasing the drag and decreasing the slippage. It is effective in surprisingly low concentrations, and it appears to be washfast."

Dr. Powers pointed out that research in resinous materials, vastly accelerated by the war-born shortages of natural rubber and silk and drying oils, followed two general directions: Surface coatings, and, as an important side line, the impregnation of fibers with resin formers.

"In the coating field, work has been centered on developing satisfactory or superior replacements for natural rubber," said Dr. Powers. "This led, directly or indirectly, to impregnating agents of the new melamine resin types, opening new horizons for non-shrink woolens and worsteds. Other modifications of these melamine types have likewise been developed, offering means of stabilizing and shrink-proofing rayons and cottons without many of the dangers of chlorine damage encountered when excessive amounts of chlorine are used in washing and bleaching."

The major problem with which textile research men have been confronted, he said, was the replacement of rubber coated and rubberized fabrics with synthetic resins to obtain fabrics with similar properties. This problem, he added, has been solved with unusual speed except for one phase. The one unsolved problem is that of contriving a substitute for natural rubber in life rafts.

"Here there are extremely difficult specifications," said Dr. Powers. "The rubberized fabric must be flexible at 8° below zero, and the raft must be capable of sustaining life under a tropic sun during weeks of exposure."

Polyvinyl butyrals and polyvinyl chloride type resins, explained Dr. Powers, were quickly drafted to replace much of the rubber being used for raincoats and ponchos. He added that the development of a method to modify the vinyl butyrals gave them properties much closer to rubber, and these may enable them to compete with or replace rubber on postwar fabrics. For duplex or two-ply fabrics, he predicted, butyl rubber appears so outstanding that it may also hold its postwar markets.

Dr. Powers indicated tremendous strides have been made in waterproofing, fireproofing and mildewproofing army tentage fabric. Since rubber became unavailable as a binder, he asserted, a wide range of resins have found application on such material. But the textile chemist's chief triumph over the rubber shortage, he indicated, has been in the field of army rainwear.

Lonn Blow Guns

Since air and water hose in industrial plants and other places are very often used with spray guns, nozzles, and hand-operated valves, The B. F. Goodrich Co., Akron, Ohio, is adding to its line of industrial hose a complete series of Lonn blow guns, whose fingertip-control is made possible by the use of rubber.

Lonn blow guns are known as air savers and water savers because of their ability to exercise a positive control over air or water flow and thus reduce consumption of water and compressed air.

The Lonn valve features an internal trigger principle and involves only three simple working parts. It is opened and closed without the use of springs, levers, or pushbuttons, merely by flexing the rubber nozzle or hose.

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Black Crystal
(Made with Tung Oil)

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Many friends of Hilo Crystal responded immediately to the news that this finish was available again. We anticipate no curtailment of the supply, yet war brings quick and unexpected changes. Your order received now—for prompt delivery—will assure you a supply of this sparkling finish.

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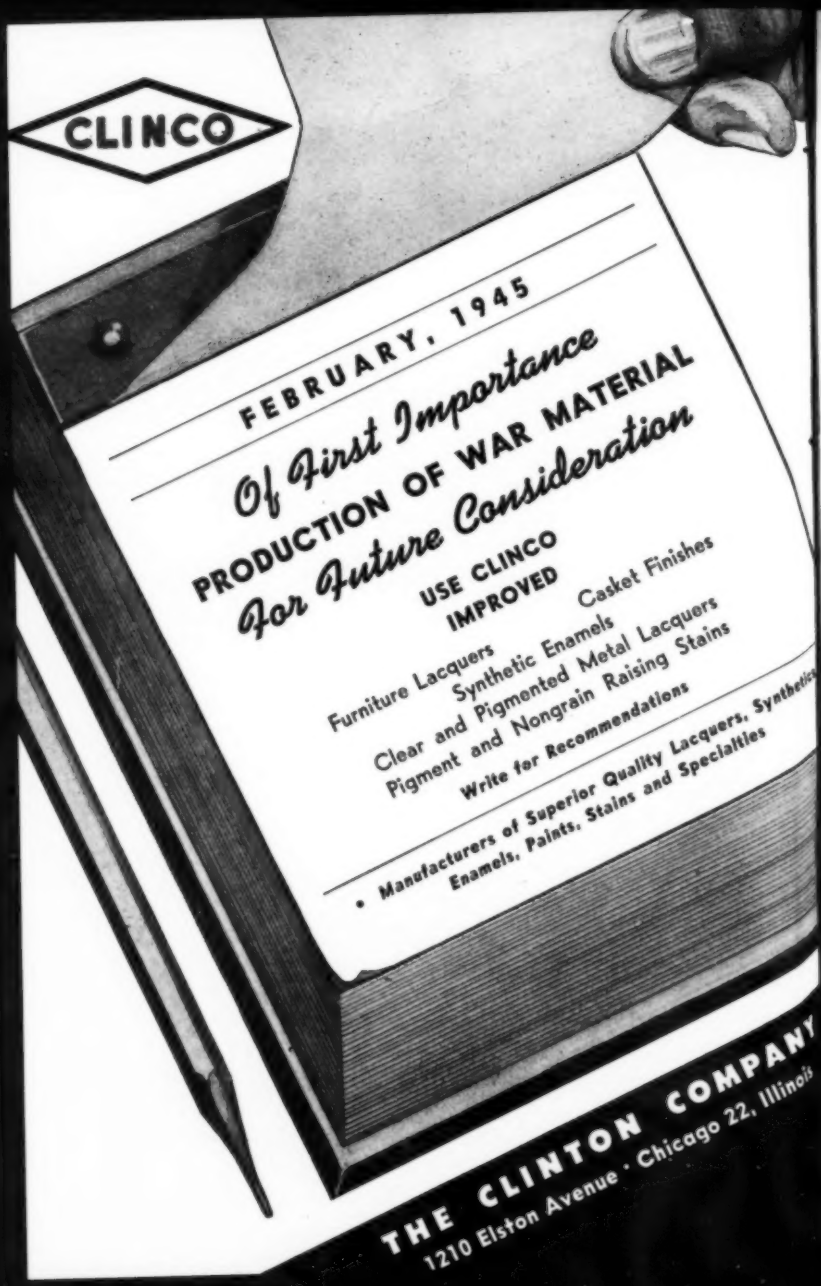
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Questions and Answers

Paint for Galvanized Metal; Zinc Dust

I notice in October issue of this magazine, on page 42, in discussing the painting of galvanized equipment, the author, Henry Novak, recommends special treatment of the metal surfaces with acid solution, etc. This is to make the paint adhere firmly to the galvanized metal.

Don't you think that a finish coat of zinc-dust zinc-oxide, conforming to Federal specification TT-P-641, type II, would give a satisfactory coating job? This would eliminate the pretreatment Mr. Novak speaks of.

The U. S. Department of Commerce has a booklet out on building materials, Report BMS102, Painting Steel, prepared by Wilbur C. Porter of The National Bureau of Standards. In this booklet, on pages 5, 6 and 7, the author discusses painting galvanized steel surfaces and suggests zinc-dust.—J. S. M.

Your letter has been referred to The New Jersey Zinc Co., who reply as follows:

Referring to Federal Specification TT-P-641, you will see that this specification covers the 80-20 zinc-dust zinc-oxide paint, with three types of vehicle—linseed oil, phenolic, and alkyd. These different vehicles are to cover different types of exposure, but there is no alternative in the government specification to zinc-dust zinc-oxide paint which has been proved, by a great many exposures, to be the most adherent paint for galvanized surfaces.

In this connection you will be interested in the enclosed copy of "Improved Maintenance of Metal Surfaces with Zinc Dust Paints". While this booklet deals primarily with structural materials, zinc-dust paint is excellent for product painting, except under a fine enamel finish. The zinc-dust paint available at the present time is not sufficiently fine in particle size to furnish a base for the smoothest of industrial enamel finishes.

Quoting from the booklet just referred to, we read:

The suitability of a paint for zinc or zinc-coated surfaces depends upon two outstanding requirements: 1) that it be distensible (capable of stretching; in other words, elastic) and retain this property over a long period of exposure to weathering; and 2) that it possess the property of adhering uniformly and firmly to the zinc surface. Zinc-dust paints meet these requirements, and Federal Specification TT-P-641, covers their formulation for the painting of galvanized iron and other zinc surfaces.

One of their merits—a property unique to zinc-dust paints—is the special "zinc-to-zinc" affinity between the zinc dust and the zinc surface of galvanized iron or sheet zinc, which provides unusually firm adherence. Another merit is their distensibility. Still another

is their durability when applied to either new or weathered galvanized iron or sheet zinc. Further, the rust-inhibitive properties of zinc-dust paints prove particularly valuable in maintenance work where the zinc coating of galvanized sheets has become abraded before painting, leaving the base metal exposed. In fact, paint manufacturers and dealers have aptly termed zinc-dust paints "liquid galvanizing".

Although roughening of the surface is not necessary to obtain adhesion with zinc-dust paints, such a procedure naturally enhances their originally good adherence to galvanized or zinc surfaces. A number of methods are used to roughen the surface of new galvanized and sheet zinc—such as weathering, sandblasting, or the use of chemical etches . . .

Ordinary acid etches are not desirable unless they are used under controlled conditions that insure the removal of water-soluble salts and loosely adherent powder which may have a detrimental effect, even with a zinc-dust zinc-oxide primer.

A simple solution that removes grease, and etches the surface in a single operation, but is still subject to the precautions mentioned above is:

Denatured alcohol	(parts)	60
Toluol		30
Carbon tetrachloride		5
Muriatic acid		5

In general, the more desirable etching treatments are the ones which leave an adherent reaction product on the surface, such as the various phosphate-type treatments when used as directed. Commercially pre-treated galvanized sheets will produce excellent results when a zinc-dust zinc-oxide paint is used.—ED.

To Remove Enamel From Wire

Is there a quick, low-cost, dependable way to remove paint or enamel coatings from rolls of wire, or wire in considerable quantities?—E. M.

Yes, a 2-motor, wire-brush type of wire stripper has been developed and is now on the market for stripping any kind of insulation off wires of various sizes and shapes. A dust collector removes the dust and dirt of stripped-off paint or insulation. In a letter we are giving you the name and address of the manufacturer.—ED.

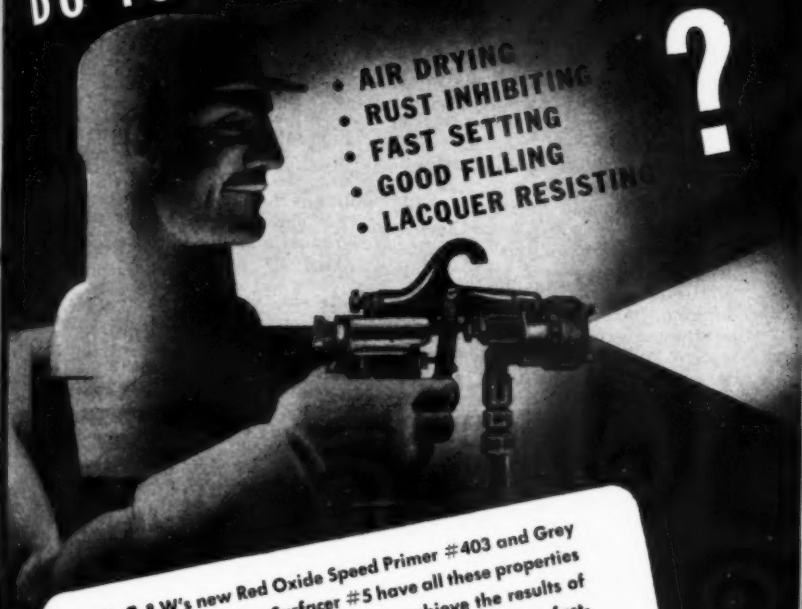
Color of Radiators

What effect, if any, does the color or kind of paint used on a radiator, have in reference to the heating results from said radiator? —W. C.

A bulletin covering this subject was released under date of Dec. 16, 1944 by the Public Relations Dept. of the National Paint, Varnish & Lacquer Association, Inc., Washington, D. C. Excerpts from this are as follows:

"As far as their effect on the performance of radiators is concerned, paints fall into two classes: 1) those in which the pigment consists of small flakes of metal, such as the aluminum and bronze paints so commonly used for painting radiators, which produce a metallic appearance and will be called metallic paints; 2) the white and colored paints in which the pigment consists not of the metals but of oxides or other compounds of the metals. Thus, those paints containing compounds of zinc, or

WHAT DO YOU NEED IN A PRIMER ?



M & W's new Red Oxide Speed Primer #403 and Grey Speed Primer Surfacer #5 have all these properties and more. They were developed to achieve the results of a zinc chromate primer on metal surfaces where a fast-setting, corrosion resistant, air-drying or baking primer or primer surfacer is required. In some respects, they excel zinc chromate primers, as extreme care in their application to obtain a very thin transparent coat is unnecessary. They air-dry to recoat in 10 to 15 minutes and dry hard overnight; they can be baked in one-half to one hour at 250° F. Both materials can be coated with lacquer enamels after air-drying or baking.

Your inquiry will receive prompt attention.

M & W

AS & WALDSTEIN COMPANY, NEWARK, N. J.

UCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALTY FINISHES FOR ALL PURPOSES

other metals, like white lead or titanium will be called non-metallic paints. These non-metallic paints are obtainable in practically all colors and white and black, while the metallic paints have the color of the metal or alloy of which the flakes are composed.

"The last coat of paint on a radiator is the only one which has an appreciable effect. Under otherwise identical conditions, a radiator finished with metallic paint will emit less heat than a similar radiator finished with non-metallic paint.

"Undercoats of paint, regardless of kind, have no significant effect on the performance of the radiator except in the very unusual case where the paint is thick enough to act as an insulating covering. From a heat release standpoint, therefore, it is unnecessary to remove the old paint in repainting a radiator.

"The effect of adding the non-metallic paint as a finish coat is equivalent to adding one section to the radiator, thus, a radiator of five sections painted with white or light tinted paint should be about as effective as another of six sections of the same kind painted with metallic paint, since each would transfer the same amount of heat to the room, provided the necessary amount of heat were supplied to each radiator."—ED.

Standard Identification Colors for Pipes

COLORS which have been selected as being standard for identifying pipes by the American Society of Mechanical Engineers, and the National Safety Council, and subscribed to by the National Board of Fire Underwriters, and the American Standards Association, for normal interior conditions, include:

Red	Fire Fighting Equipment
Yellow	Gas or Dangerous Materials
Blue	Steam or Water Exhaust and Protective Materials
Green	Air Lines and Safe Products
Purple	Extra Valuable Materials

For severe or abnormal industrial conditions, the same basic colors are used although slightly different in hue, when necessary, where chemicals or fumes are encountered. All piping is to be painted its entire length unless it is covered with insulating material of some type difficult to paint. In this case metal bands, five inches or more in width, should be painted the proper color, and clamped around the pipe at suitable intervals. All outlets, valves, tees, etc., should be coated. As a further protection in the case of people who may be color blind, one leading paint authority has recently suggested that special geometrical symbols could well be used in addition to the basic color. Words denoting the contents of the respective pipes, also could be painted on the solid color, as a further precaution.—N. P. V. & L.

Jones-Dabney Co. Officers

At a recent Directors Meetng, the following officers of the Jones-Dabney Co., Division of Devoe & Raynolds Co., were elected:

Wm. C. Dabney	President.
A. W. Bornhauser	V.P. & G. M.
J. C. Wilcox	V.P. & Director of Sales.
E. J. Probeck	V.P.
Wm. S. Stark	V.P.
F. H. Volk	Secretary.
E. L. Pangborn	Treasurer.

Mr. Frederick A. Brown resigned some months ago as Vice President in Charge of the Wood Finish Division, and Mr. George A. Litchfield recently resigned as Vice President and Director of Sales to resume his former position with the company in Chicago.

Protective . . .

Decorative . . .

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WRINK-ALL

MADE from non-critical materials in fine, medium or course texture. A proven product that has received wide acceptance by manufacturers everywhere.

WRINK-ALL has all the characteristics of old type wrinkle in appearance, uniformity, application, baking schedules, etc. Works well under severe conditions in foul ovens. It is available in all shades and colors, and in unlimited quantities for immediate delivery.

NO PRIORITY REQUIRED

[*Order 5 gallons of Wrink-All today and give it a severe production test.*]

LACQUERS—THINNERS
METALLIZED FINISHES
SYNTHETICS AND
SPECIAL COATINGS
FOR ALL SURFACES

United Lacquer Mfg. Corp.

General Offices, Laboratory, Factory: LINDEN, N. J.

NEW ENGLAND MFG. DIVISION, EVERETT, MASS.

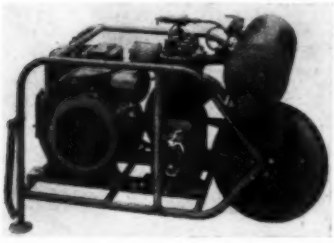
Materials Supplies Equipment

Portable Spraying Outfit

Many industrial activities of the postwar era will be vitally affected by the fast-moving equipment developed for modern mobile warfare. Quick and efficient maintenance painting is among these. An industrial spray painting outfit that can be moved from place to place will be marketed after the war by Binks Mfg. Co., Chicago, Ill.

As now used by the army, the Binks Model E-2 paint spray outfit contains all necessary equipment needed for two men to spray paint. The illustrations show that the outfit comes in two parts. One is the wheelbarrow-mounted gasoline engine air compressor. The second part is a strong chest containing: two pressure tanks for holding the paint, and regulators for controlling the flow of paint and air to the gun; an extension which, when attached to the gun, allows the operator to paint places that cannot be reached with the gun alone; a set of hose to interconnect the equipment and to connect it to the air compressor.

Spraying equipment, Binks Model E-2 Portable Spray Outfit, is shown compactly packed in chest for army use. The smaller chest contains tools, accessories and replacement parts. An outfit similar to this will be made available in peacetime.



Compressor unit, Binks Model E-2 portable spray outfit, is mounted on a light-weight wheelbarrow frame which permits it to be easily transported in the field. This unit includes an air compressor with an automatic loader, a gasoline engine, and an airreceiver tank. This tank stores air at a pressure up to 90-lbs. per square inch.

A smaller chest which fits inside the larger one contains: two Thor Model 17A spray guns for applying the paint; a set of tools necessary to make minor adjustments and repairs; a set of accessories for holding the fuel and the grease necessary for proper operation; a set of parts to replace those most likely to wear or be damaged in use.

The pressure tanks hold the material, providing a means to keep it mixed, and feed it to the guns at a constant pressure. The extension device is attached to the spray gun in place of the standard air and material nozzles and the air atomizes the material in the nozzles of the extension

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WHERE A LACQUER OR SYNTHETIC IS DESIRED

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- METALLIC LACQUERS
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- WATER DIP LACQUERS
- GLASS AND PORCELAIN
- ENGINE LACQUERS
- MARINE LACQUERS
- AIRCRAFT SPEED FINISHES
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- BRONZING LACQUERS
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- SURFACERS, ETC.

Whether your requirements call for a flexible finish for tiny safety pins or a heat-resistant, chemical-resistant finish for aircraft engines . . . a finish for wood or glass or metal or plastic . . . Alaka can tailor-make it.

Perhaps yours is a finish requiring high dielectric strength for an electrical instrument . . . or flexibility for some new gadget . . . or a finish requiring smoothness for speed in air or water. It makes no difference! Give us your specifications and we'll give you the finish.

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Custom Tailored Finishes
TO FIT YOUR REQUIREMENTS

ALAKA
THE TECHNICAL TOUCH

LACQUER & CHEMICAL CORPORATION 220 FORTIETH ST. BROOKLYN 32, N Y

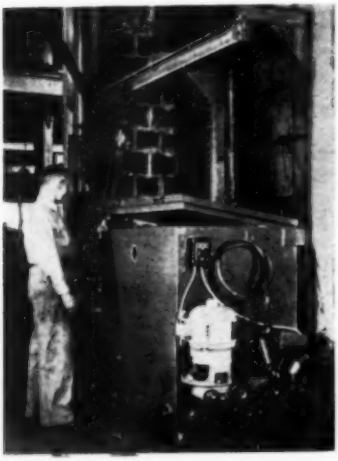
head, ejecting it in the form of a fan spray.

The compressor unit includes an air compressor with an automatic unloader, a gasoline engine, a wheelbarrow frame and an air receiver tank. This tank stores air at a pressure up to 90-lbs. per square inch and removes the pulsations from the air before it goes to the spray gun.

New Machine Sprays Cleaning Fluid

In washing metal parts that are heavy with dirt, oil or grease in still tanks, an oil film forms and floats to the surface. As a result, when cleaned parts are taken from the tank, a water rinse is usually necessary as an immediate follow-up. Spray washing avoids this difficulty by cleaning in one step and continuously filtering the solution and separating the oil.

Working along these lines the Optimus Equipment Co., Matawan, N. J., has designed a new batch spray-type cleaning machine which is especially adapted to the cleaning of large heavy parts. The machine is portable and uses any cleaner. As it is operated closed, there are no fumes or unpleasant odors. The work is washed and rinsed in the same compartment, but the waste water drains into the sewer, and does not contaminate the solution. It is adaptable to any low-cost convenient heating system, with optional thermostatic control and insulation.



Batch spray-type cleaning machine.

In principle, the machine consists of a sturdy tank with cleaning door, drain cock, thermometer, water-inlet cock and filter basket. The parts are handled by an overhead track and carriage and are lowered on a flat grille or rack or in a basket. Hot or cold solution is pumped through the spray nozzles fastened on rocking frames so as to reach all surfaces of the work. All working parts are easily removable for cleaning or repair.

The machine may be used for any dipping operation such as washing, rinsing, pickling, paint stripping, rust-preventive coating, etc. It is available in a variety of sizes, and is particularly suited for Diesel and automatic engines, motors, compressors and other heavy work.

Steam Jet for Pickling and Rinse Tanks

An improved design in steam jets deserves the attention of users of pickling and rinse tanks. It is called the "Weldco" and is a product of The Youngstown Welding & Engineering Co., Youngstown 9, Ohio. It heats while it agitates, while it circulates the contents of the tanks.

Fungus-proof Cloth Tape

A new, exclusive fungicide treatment is used in manufacturing Mystik Self-Stik cloth tape, according to an announcement by Mystik Adhesive Products, 2635 N. Kildare, Chicago 39, Ill. This makes possible the protection of shipments and products against fungus growths, which have proved

ALUMINUM RESTRICTIONS LIFTED!

NOW you may buy **ALUMINUM PAINTS—ALUMINUM POWDERS** — and **ALUMINUM PASTES**—for any purpose WITHOUT RESTRICTIONS! Get the best in *pre-war quality* — **"ILLBRONZE PRODUCTS."** Anticipate your needs for future delivery soon! See your nearest distributor or write direct!

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ruinous to many war materials, particularly those shipped to the South Pacific area. Such precision equipment as radio, radar and aircraft instruments, as well as aircraft fuselages, are among the many items that must be protected against fungus.

The fungicide is applied to all components of the tape—the cloth, the adhesive and the backing which impregnates the tape against water, moisture, salt spray, gases and other damaging elements. The tape is used as a seal in packing and as a protective covering when applied directly to the product itself.

Protection for Threaded and Machined Parts

New convenient internal and external safeguards of threaded and machined parts, fittings, etc., are offered by the Precision Paper Tube Co., 2033 W. Charleston St., Chicago 47, Ill.

Precision's new thread protectors and dust caps are made of spiral-wound fiber, kraft paper, or cellulose acetate, under heat-treated compression. They are designed and constructed for greatest durability in protecting fittings, exposed openings and ends, tubing, a multitude of products —from paint, moisture, rust, dirt, grit, dust or damage in packing, storage or shipping.

These protectors are shaped to the article to be safeguarded—cylindrical, square, rectangular or tapered, crimped, flared or perforated, with close tolerances. Name of part and number, as well as name of maker can be printed in the protector.

New Spray Gun For Industrial Cleaning

The DeVilbiss Co., Toledo, Ohio, announces a new pressure-feed spray gun especially designed for industrial degreasing and cleaning operations on castings, forgings, sheet metal, etc. Operated from a pressure-feed tank,

Sprays cleaning fluid, solvents, etc.

the gun handles all kinds of commercial solvents and cleaners, producing a heavy, driving, but well atomized spray that removes dirt and grease.

Exceptionally light and shaped to fit the hand comfortably, this new gun has a 2-finger, easty-to-pull trigger designed to reduce hand fatigue. When the trigger is pulled only part way back, air alone is emitted from the nozzle, permitting the gun to be used for dusting and drying.

Makes "Distilled" Water

Ordinary water can now be transformed into the chemical equivalent of distilled water by a simple filtration process developed by American Cyanamid and Chemical Corp., (30 Rockefeller Plaza, New York 30, N. Y.) and made available in portable and stationary equipment designed for all types of users.

With these units, trade-marked Filt-R-Stil, water which is virtually mineral-free is made readily accessible for research laboratories; in electronic and electrolytic equipment fabrication; in the manufacture of textiles, leather, paper, pharmaceuticals, food, dyestuffs, and many other products, as well as in the filling of storage batteries.

The principle of the Filt-R-Stil is one of filtration by skillful utilization of melamine-derived and other resins, developed by the American Cyanamid Co. Water is passed through beds of these ion exchange resins which trans-

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include
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to contribute to the beauty, wear, performance and value of your products

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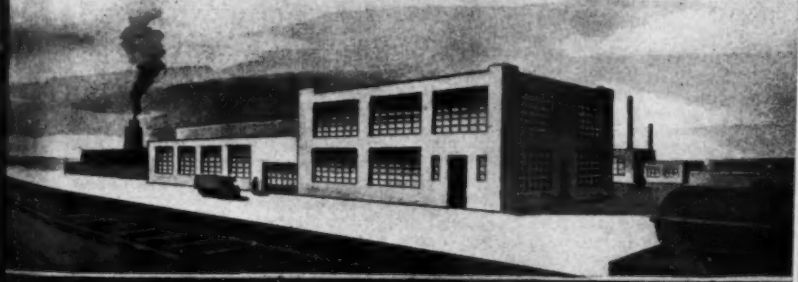
We invite you to consult with our staff of experts on technical matters regarding your finishing problems



DOPES · LACQUERS · ENAMELS

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FINISHING PRODUCTS CO.

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New Jersey

form the dissolved salts in the water to the corresponding acids and in turn absorb the acids. The process may be visualized by picturing water as containing flowing metals which are attracted by a magnet except that the magnet, in this case, is chemical rather than electrical.

Small Plastic Coater

Two new small plastic coaters have been designed by the Youngstown Miller Co., Sandusky, Ohio. The company builds medium and large size plastic coaters that are especially designed for properly handling the job of melting and maintaining ethyl cellulose and other plastic protective coatings in which parts and tools are dipped.

The increasing use of these plastic protective coatings by companies of all sizes has brought out the urgent need of suitable low-capacity heating and melting equipment. These new models were designed to take care of a company having small parts or tools to be coated prior to shipment; or for a company that wants to protect their own precision cutting tools and gauges while being stored prior to use.

Each coater has a plastic pump arrangement which provides constant level in the dip tank and continual removal of surface film and bubbles caused in dipping. In addition, oil jackets the sides and bottom of each tank. Oil and plastic are thermostatically controlled so that the electric heaters are shut off when either reaches its ceiling temperature.

Pacific Coast Fans

Two new high-efficiency axial-flow fan units have been announced by Dynamic Air Engineering, Inc., 1619 S. Alameda, Los Angeles 11, Calif.

Equally unique in size from the mighty 60-in. to the midget 2-in., they are believed to be the largest low-pressure and smallest high-pressure propellers engineered and produced on the Pacific Coast.

The midget 2-in. propeller has been developed for a complete fan unit. It will be powered by a tiny motor of approximately .002-hp. and will deliver 30-c.f.m. at .30-in. S.P. Originally engineered for the cooling of modulators in air-borne electronic equipment, it is expected to find many and varied applications.

In addition to highly specialized fan units Dynamic Air Engineering, Inc., manufactures a complete range of low and high pressure fans designed to operate at speeds from 870-r.p.m. through the normal range of A.C. speeds and into series wound and high-cycle speeds up to 14,000-r.p.m.

All these fans from the 2-in. to the 60-in. are being built in both single stage and multi-stage varieties. Two-stage assemblies double the single-stage pressure characteristics.

Dye of Fluorescent Quality

Krieger Color & Chemical Co., 6531 Santa Monica Blvd., Hollywood 38, Calif., announces a new type of dye solution of fluorescent quality to be used under black light, to be known as Kriegr-O-Dip — "Fluer-O-Plas K." This new dye can be used on any type of plastic material, transparent or opaque, for decorative purposes. Also ideal on medical equipment, dials, etc.

Water-Resistant Adhesives

Four newly improved water-resistant adhesives, designed for overseas packaging of military parts, are announced by Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill. Each adhesive has individual characteristics that make it best suited for a particular operation in the manufacture and final sealing of waterproof bags, case liners, and the gluing of V-board export box flaps. Developed to meet the water immersion tests of Army and Navy Packaging Specifications, they are currently being used by Army depots, arsenals, and war plants whose packaging must meet specifications.

Remember Pearl Essence for

A Decorative Finish

MEARLMAID Pearl Essence is being used on hundreds of different products to produce a decorative and attractive effect.

Investigate the numerous advantages of a Mearlmaid Finish before you select the final coating. Its sales appeal and merchandising value are important.

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ROSELLE, N. J.

EASTPORT, ME.

Priority Rating Is Not Required

Available in Unlimited Quantities

"WORLD'S LARGEST PRODUCER OF PEARL ESSENCE"

Booklets Catalogs Circulars

Rust-proofing Oils, Waxes

The Enthone Co., New Haven 2, Conn., lists in its new 8-page, 3-color bulletin, special oils and waxes for use in rust-proofing metals.

Enthone Cleaner-100

A 4-page bulletin under the above title reveals timely and practical information about cleaning metal surfaces preparatory to application of paint coatings. It is published by The Enthone Co., 441 Elm St., New Haven 2, Conn.

Material Pump Booklet

An 8-page bulletin, printed in three colors, shows illustrations and gives important practical information about paint material pumps, spray guns, air compressors and accessories. For a free copy write Alemite Division, Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.

Free Booklet on Production Cleaning of Die Castings

An informative, timely 12-page Digest entitled "Production Cleaning of Die Castings" has just been released by Oakite Products, Inc., New York 6, N. Y. Because of the high importance of preliminary preparation of die castings before finishing, this information will be of particular interest to all users and commercial producers of die castings.

The Digest describes various cleaning techniques and materials for the surface preparation of aluminum, zinc, magnesium, brass, bronze, copper, lead or tin-base die castings prior to the application of organic, chemical or electro-plated finishes. The data given are based on actual experience in hundreds of plants producing war and civilian supplies. A free copy of this Digest may be obtained by writing to Oakite Products, 32F Thames St., New York 6, N. Y.

Bulletin Lists Chemicals for Coloring Metals

A new 8-page bulletin of chemical products lists materials for chemically coloring copper and brasses; for example, yellow, gold, brown, blue and iridescent. Aso materials for producing a jet black color on practically all metals. For a free copy, write The Enthone Co., New Haven 2, Conn.

Brochure Shows Picture Story of Schenectady Varnish Co.

An introduction and interesting picture story of the Schenectady Varnish Co., Schenectady, N. Y., showing views inside and outside the plant, is exhibited in a plastic bound brochure containing 28-pages 8½x11-in. printed in two colors. These pages are bound between heavy paper covers printed in red, blue and black. The book is dedicated to the users of varnishes, enamels, and synthetic resins for industrial purposes.

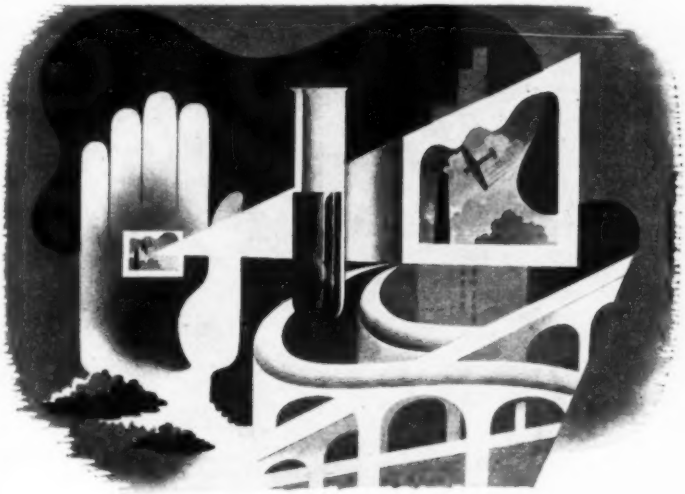
Waxes, Oils, Gums, Chemicals

The Apollo Chemical Co., Inc., announces the opening of offices at 51 E. 42nd St., New York 17, N. Y. The company is engaged in the buying and selling of chemicals, oils, waxes, resins, gums and all other chemical raw materials, and is offering a complete purchasing service including assistance in filing applications for allocated materials, priorities, etc. An attractive, 4-page folder, describing the service and chemicals, is available without charge.

New Plastic Coater Bulletin

The Youngstown Miller Co., Sandusky, Ohio, announces a new bulletin YM-800 which describes the operation and exclusive features of its Plastic Coaters. These machines are designed to properly melt ethyl cellulose compound and other plastic coatings used for protecting parts and tools being stored or shipped overseas. The same equipment is also used for melting low-temperature plastics used for permanent coatings.

Twenty-two different models, with a wide range of dipping compartment sizes and melting capacity, are available.



VISIONARY DREAMS

In test tubes fired by war, chemical research has laid the foundation for far-reaching prosperity. New products have been created, new bases developed, new techniques evolved which stagger the imagination . . . which translates today's dream into tomorrow's demand. How this research will affect your business, what it can do for your product, is obviously impossible to ascertain except by expert examination . . . and such examination should certainly be included in your post-war planning. Our staff of expert finishing engineers will be glad to cooperate with your organization. Your inquiry incurs no obligation. Address The Stanley Chemical Company . . . manufacturers of Stanley Lacquers, Synthetics, Enamels and Japans . . . East Berlin, Connecticut.

Stanley Chemical

To Correctly Finish Aromatic Red Cedar

BY RICHARD BLACKWELL

AROMATIC RED CEDAR is used in the furniture and architectural fields mainly because it possesses two unique properties. The first is its distinctive color and texture. Properly finished cedar has unrivaled beauty. The second unique property of cedar is the aromatic oils it contains. These volatile oils will protect woolens and furs from damage by moths. Hence the use of cedar for chests and for lining closets. However, these aromatic oils are the source of considerable difficulty in finishing. For that reason certain practices must be followed if cedar is to be finished successfully.

The conditioning of the cedar lumber has an important bearing on successful finishing. Proper kiln drying will remove some of the more volatile portions of the cedar oils, as well as the moisture. The removal of some of these oils makes the finishing problem simpler. The lumber should be dried to a moisture or volatile content of no more than 9%.

Seal in the Cedar Oil; Pure White Shellac Is Best

In finishing the outside surfaces of solid cedar furniture, especially chests, two principles must be followed: First, apply a coating that will effectively seal in the cedar oils. This is necessary not only to direct them inward and prevent their loss by exudation and evaporation, but also because the cedar oil will have a pronounced softening effect on the final coat.

For this sealer coat no material seems to be as effective as one or two coats (preferably two) of pure white shellac. *The shellac must be strictly pure,* because shellac adulterated with rosin or other resins will not be nearly as effective. However, a little mixing lacquer added to the shellac will hasten the drying and improve the flow without interfering with its sealing properties. For the sealing coat, "4-lb. shellac" should be reduced in the proportion of two parts shellac and one part alcohol. If mixing lacquer is to be used, a good sealing coat can be made with three parts "4-lb. shellac," one part mixing lacquer, and two parts alcohol.

Use Coatings That Are Not Attacked by Cedar Oil

The second principle to be followed in finishing the exterior surfaces of solid cedar chests or other furniture is to *avoid the use of materials which may be attacked and softened by cedar oil, or otherwise have an affinity for it.* Drying oils in particular must be reduced to the minimum in such finishes. So also must free fatty acids such as rosin and certain

---

How to treat and finish aromatic red cedar in such a way that cedar oil within the wood will not exude later, or soften the cedar finish to the point where it will be tacky.

NEW WOOD

The Pliable Wood Bond

PLIABLE — Easy to use

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Of superior quality, New Wood is a pliable, easy to work, efficient crack and crevice filler. New Wood forms a perfect "Bond" with nature's woods and will take all types of stains, varnishes, lacquers, enamels and paint. New Wood dries very hard and rapidly, and can be treated as wood. Like all Behlen's Products, "New Wood" meets all qualifications and requirements of the professional craftsman. New Wood is packaged in 1/4-lb., 1/2-lb., 1-lb. and 2-lb. cans.

H. BEHLEN & BRO., Inc.

HARDWOOD FINISHING HEADQUARTERS SINCE 1888

10 CHRISTOPHER STREET NEW YORK 14, N. Y.

natural resins. Only neutral coatings with closely bound drying oils may be used. Thus, varnishes must be especially selected for the purpose. They must be made with neutral, relatively insoluble, high-melting point resins and neutral hard-drying oils.

To avoid the possibility of trouble with varnishes, some finishers prefer to use lacquers or force-drying types of urea-alkyd furniture finishes. These materials are (in general) less likely to be attacked by cedar oil than varnishes.

Evidence of attack by cedar oil is revealed as loss of gloss, softening, or even the development of a sticky or tacky surface. The attack may not be evident until weeks after finishing.

Fill in Torn Grain With Colored Crack Filler

In finishing the exterior surfaces of solid cedar furniture the first step is to fill in any places where the grain has been torn by machining operations. Cedar, especially the knotty variety, has considerable cross grain which is likely to be torn when the surface is planed, or when edges are moulded or shaped. For filling such depressions and small knot holes, use a colored crack filler that is mixed with water to a thick paste. Apply with a spatula or putty knife. When it is dry, sand the surface smooth. Some finishers prefer to use stick shellac, burning it in with a heated knife. *Avoid the use of oil putties.*

The next step is to apply non-grain-raising sap stain to the light sap streaks in the wood. Do not use oil colors or oil or pigment stain for this purpose. Then apply one or two shellac sealing coats and lacquer, or urea-alkyd furniture finish, or a specially selected varnish for the final coats. Rub to a medium sheen or high polish when dry. Some manufacturers prefer to use flat finishes and steelwool and wax when dry.

Insides of Cedar Chests Unfinished or Wash-Coated

It is not customary to apply any finish to the inside surfaces of cedar chests. However, some concerns prefer to apply a very thin coat of pure white shellac to control the rate of loss of the aromatic oils, and to eliminate tackiness. One part of 4-lb. pure white shellas should be reduced with two parts of alcohol for this coating. Some use a very thin nitrocellulose solution, known as "bleaching lacquer," or a thin lacquer sealer.

In finishing chests or other furniture made of cedar, it is extremely important to avoid allowing any oxidizing material to get on the inside surfaces. This oxidizing material seems to have such an affinity for cedar oil that a drop no larger than a button will attract a large puddle of cedar oil over a period of months. This means that fillers and varnishes must be kept out. If such materials are sprayed on, the lid should be shut tight.

Drawer slides on cedar furniture may be prevented from sticking by applying two coats of pure white shellac on the runners and then waxing.

If the finishing system is to be enamel, it is still important to use the shellac sealing coat. The enamel should be of the lacquer or synthetic type.

Where Cedar Is Veneered With Walnut, Mahogany, Prima Vera

Heretofore we have considered only finishing materials and techniques for solid cedar for interior use. Most cedar chests, however,

Product Finishing Future

"Call on Walker"

H. V. WALKER CO.

Elizabeth, New Jersey

MODERN PRODUCTION FINISHES

are made of solid cedar panels faced with such conventional cabinet veneers as walnut, mahogany, and prima vera, in order for them to blend with other furniture. These chests are finished much in the conventional manner for veneered furniture, except that the precautions mentioned earlier must be kept in mind.

It has been found that the adhesive used in attaching the veneer to the solid cedar core has a bearing on the finishing problem. Sheet phenolic film has been found to be the best adhesive. It seals in the cedar oil better than other adhesives.

Non-grain-raising stains are preferred for the veneers. Wash-coating with shellac or lacquer sealer follows. The filler must be made with a relatively neutral vehicle comparatively short in oil because the "wicking" action may draw the cedar oil through the glue line to the surface. The precaution of avoiding oxidizing materials on interior cedar surfaces is of equal importance here. The sealing coat may be lacquer sealer. The final coats are preferably lacquer or synthetic, although high grade varnishes may be used. The final coat is rubbed or steelwooled and waxed.

Finishing Cedar for Outside Exposure

Where it is desired to finish bare cedar wood in a clear finish to withstand outside exposure, the problem is more difficult. Here the intermediate shellac coat would affect the durability of the finish. The best clear material to use directly on the wood is one of the newer finishes made from resins based on polymers of derivations of acrylic acid. This type of material is quite expensive, but it is highly resistant to cedar oil and has good exterior durability in the clear on wood. Another good material would be an alkyd or a urea-alkyd force drying finish. The long oil alkyds should not be used because they are affected by cedar oil. Special lacquers made to give good exterior service on wood are also satisfactory. In general, avoid the use of varnishes on the bare wood.

Sap-Staining Walnut on Conveyor Line

SAP WOOD in walnut provides many a headache to the finisher who likes to do a careful uniforming job, despite the many varied shades and sizes of light streaks that he encounters and must work into the finished job. To do this blending expertly requires practice and patience, but the results are well worth the effort.

The following method is fast enough to be used on the average conveyor line. In fact, it is possible to sap stain a 20% butt-walnut furniture top 24x36-in. in as little as a minute's time, after the operator has developed enough adeptness with the brush and a quick accurate sense of color harmony.

For butt walnut do as follows:

1) Sponge the entire piece with a pad of cheesecloth about 3½x6-in., saturated with alcohol.

2) Before the alcohol has dried completely, brush on sap stain made of spirit colors in black, red, and yellow. Keep a moderately wet edge and use a 2-in. soft flowing brush.

3) Keep ready for use, in the left hand, another cheesecloth pad moistened with alcohol; with this pad blend the stain into the grain,

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Padding Lacquer

PADDING

FRENCH POLISHING

Qualasole is fast becoming a "Must" in the finishing departments all over the country. Craftsmen realize its superior qualities when frenching, polishing, padding, touching-up, renovating—on antiques, reproductions, modern or mass production. Qualasole creates new life in wood—is quick drying, durable, permanent and easy to apply. Compare Qualasole with any commercial varnish or lacquer and you will agree it is America's Finest Padding Lacquer.

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working the sharply brushed edges of color into the light areas.

The third operation (outlined above) requires some speed, as the success of the entire job depends on blending the stain in before it has had a chance to dry out in sharp lines and streaks.

Allow about one hour of drying at 70° to 80°F. before filling over the sap-stained surface. If greater speed is desired in the drying, an electric fan can be played over the surface.

If the walnut to be stained is straight grained and the sap areas are long and narrow (not wider than 1½-in.), shade in the alcohol stain with a small decorating spray gun.

Some finishers prefer to do this on the bare wood, but staining can also be done with walnut lacquer stain, spraying it directly over the dry filled surface.—NORMAN H. VOIGT.

Multiple Spray Booths—Spray booths of the water-wash or water-curtain type have been with us long enough that most of us are fairly well acquainted with them, but various multiple-setup arrangements continue to attract our interest from time to time. In one case, a number of water-wash spray booths are arranged in a line or a battery, side by side, so the work travels progressively through the string of booths on an overhead chain conveyor. Operators stand on a grating in each booth, with their backs to a conditioned-air inlet in the wall. Under the grating is a sump, from which collected paint can be skimmed. The first booth in the series has its operators facing in one direction, and the second has them facing in the opposite direction. The third booth has its operators facing the same direction as in the first, and the fourth the same as in the second, etc. Centrally located equipment is provided to supply the conditioned air to the spraying booths at the proper temperature. The same type of booth, of course, may be and sometimes is used as a separate or individual installation.

Frolics in the Finishing Room

A YOUNG SALESMAN was having his company's lacquers tested against others on a competitive basis. A piece of furniture had just been sprayed and, as the solvents were evaporating, many tiny bubbles or fissures appeared and burst. The plant superintendent was there and noticed what was taking place. He called the young salesman over to the piece and said:

"Look, your lacquer is full of bugs."

"Look, your lacquer is full of bugs; just look, hundreds of them."

The young salesman looked at it but didn't say a word. Finally he

Bathing Beauty

This young lady knows that fastidious grooming makes a great difference in her attractiveness — just as you have found that appearance alone can play an important part in the increase or decrease of your product's sales-appeal.

If your product is not receiving the attention you feel it deserves, we'd like to help you. A finish especially created by our artists for your product will flatter its fine lines, lend new distinction to its appearance, and catch the eye of the most casual shopper.

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walked to where the foreman finisher was supervising some other work and earnestly inquired:

"What do you think is the cause of all of those bugs being in the lacquer? Do you think it comes from the workmen leaving banana peelings, fruits and lunch left-overs lying around, and the little fruit flies getting in the lacquer?"—H. NOVAK.

High-Solids Lacquer

ACCORDING to a year-end story released by the News Bureau of a large eastern manufacturer, one of the newest developments in nitrocellulose lacquer is a finish with a high-solids content at spraying viscosity. This reduces the number of coats needed to produce an effective finishing job.

This improved high-solids lacquer not only cuts the number of coats needed up to 40%, which reduces production time, but by reducing the number of coats, a saving in the amount of solvent needed is also obtained, without affecting the quality of the finish.

This improved lacquer will not only be a boon to furniture, automobile, and other finishers who want a finish with hard-wearing qualities, but may be applicable in the coating of cloth and paper.

Detrex Celebrates 25th Anniversary

Detrex Corp., Detroit, Mich., manufacturers of industrial cleaning equipment and chemical cleaning compounds, recently held a series of meetings in the company's various sales areas. These meetings had a dual purpose—to mark the beginning of the Corporation's 26th year in business, and to cover present and contemplated developments in the manufacture of various Detrex products.

The first of these meetings was held in Detroit on January 12th, 1945, the anniversary of the founding of the company in 1920. Members of the Detrex organization in the Eastern Region met at Hershey, Pa., on January 19 and 20. Western, Pacific and Southern regions also held meetings in honor of the occasion.

Robt. A. Emmett, President and Chairman of the Board of Detrex Corporation at Detroit, Mich.

At the Detroit meeting, Robert A. Emmett, President And Chairman Of the Board and a member of the original partnership which started the business, traced the history of the company from the days when all manufacturing operations were performed in a small garage, to the present time with the firm occupying more than 120,000-sq.ft. of floor area in its modern Detroit plant. He also announced the election of two Detrex executives to new posts. A. O. Thalacker becomes Vice-President and General Manager, and E. W. Allison is now Secretary of the company.

How to Step Up Production of Grinding and Finishing

Four new publications illustrating and describing the 3-M Method of grinding and finishing have been released and are available upon request from Minnesota Mining & Mfg. Co., Saint Paul, Minn.

The largest booklet in this new series is designed to provide up-to-the-minute facts and information on this speedy, economical grinding and finishing method, in the most concise, practical and usable form. It is illustrated with actual "close-up" shop photographs covering a multitude of grinding and finishing operations.

The three smaller booklets in the series deal individually with the 3-M Method, as applied to the grinding and finishing of small parts and tools, heavy-duty grinding and finishing of flat or curved surfaces, and the 3-M Method employing a semi-portable unit for grinding and conditioning raw metal stock.

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Editorial

Improved Finishes Will Come Eventually

★ Many users of finishing materials are expecting miraculous changes in postwar finishes. There will, I am sure, be greatly improved products on the market as soon after the end of the war as the finishing material manufacturers can go into civilian production.

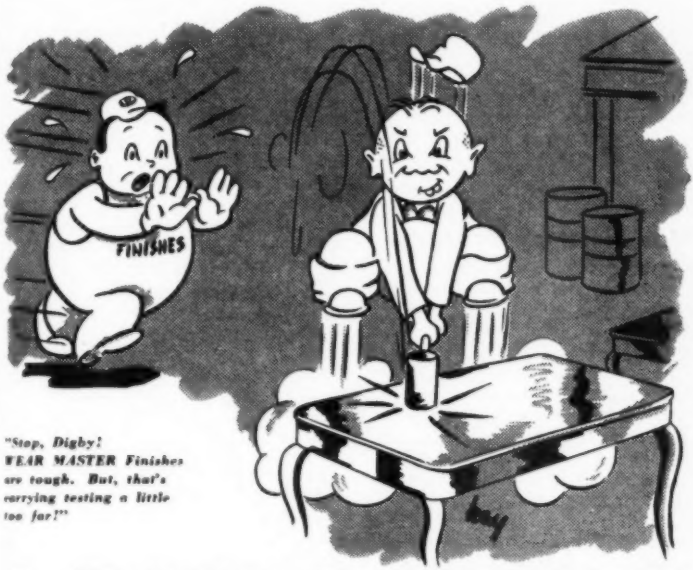
Several months may elapse before any greatly improved materials will be available. This is due to the fact that many of the raw materials used in the new formulations will not be available for some time after the war. Then many of these new finishing materials haven't gotten any farther along than the laboratory test panels; and before they are put on the market they will have to be tried in various plants and under various conditions. This takes time and, of course, some adjustments will be necessary to make the materials suitable for the various products on which they will be used.

While laboratory technicians and chemists have done remarkable work and have gained a lot of valuable experience making finishing materials for war industries, we must realize that they are not exactly miracle men. It will take a lot of adjusting, for instance, to change certain war product varnishes and lacquers to make them suitable for use on a modern conveyorized furniture finishing system.

We have heard a great deal about the new postwar finishing materials, and I fear that we will be in too big a hurry for them. We will be impatient with our supplier, but we must realize that he is doing his best to get them ready for us.

I am sure that in time the post-

★ Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.



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war materials which are in the process of formulation will be far superior to anything we have seen. But in the meantime, let's be patient and use our present materials. Our job now is to put our best into war production and keep it up.—H. W. CHESTER.

War Finishing Progress

★ Protective coatings have been formulated and kept to rigid specifications for war materials. These coatings withstand all types of abuse—weather, wear, tropical heat, steaming jungle, snow, ice, rain, mud, salt water and salt air. War materials are not painted for decorative or show purposes, but for necessary protection against the elements, and for deception or camouflage purposes. Result is that when hostilities end and we are back to manufacturing civilian products again, we will have better finishing materials, methods and equipment, much of which has been developed since the war began.—H. NOVAK.

Absenteeism, Foreman's No. 1 Problem

★ The foreman finisher, like every other department foreman, has numerous problems confronting him every day. These problems have multiplied during this war until they have reached tremendous proportions, but the No. 1 problem in the finishing room today is absenteeism. This has reached a serious stage. It has slowed down production and in many cases it has caused a lowering of the quality of finished products.

Absenteeism is due to a number of causes. First, many women are employed in industry today. Unlike male employees of prewar times, these women have domestic problems. Many of them have children and, due to labor shortage and lack of nurseries or day schools, etc., they are unable to secure anyone to care for their children while they are away at work. In many cases they are compelled to do their housework after they get home from the factory. This causes exhaustion and, of course, prompts some of them to work only part time.

Then they are greatly concerned about their children's health (as they should be). If Freddie or Sally has a cold or illness, mother feels obliged to stay home to care for the youngster.

Another reason for absenteeism is that many of the male employees in the factories today have been rejected for military service because of physical disabilities, hence some of them are not physically able to work regularly.

Then there are some male employees who had retired from work because of their age, but since the war has started they are back to work. So, because of their age, they cannot work as hard or as regularly as younger men.

Several different methods have been and are being used in an effort to cope with the problem of absenteeism. Some of them have helped to reduce the number of absent employees, but so far as I know there has been no very successful method developed yet.

Some factories have forms for the absent employees to fill out when they return to work. The employee is requested to accom-

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pany his foreman to the personnel office where he is asked to fill out a form, giving his reason for being absent, number of days or hours absent; if sick, the name of his physician or hospital, etc. This gives the company a record which can be checked over to determine whether or not the employee makes a practice of being absent frequently, and whether or not he has valid reasons for being absent.

In the case of an employee who deliberately absents himself often, it is the practice of some companies to lay him off for a few days at a time without pay, as a penalty for being absent.

In the case of women employees who have children, some of the larger concerns have established nurseries where they hire qualified women to care for the children, charging the employees a nominal fee. In this way one woman is able to care for several children. There are some other methods employed to try to lower the frequency of absenteeism and, of course, we must keep on trying.

If we could only impress upon the employee's mind the number of precious man hours lost each month and hence the number of lives lost at the battle fronts, as a result of absenteeism, then and only then perhaps will we be able to greatly reduce the frequency of absenteeism in the finishing room and in all other departments of the factories today.—H. W. CHESTER.

Keep Your Finishing Room Clean

★ If you could visit finishing rooms in factories throughout the country, you would probably find many of them in a more or less unclean condition. There are exceptions, of course, particularly in the largest manufacturing plants. For some reason many people seem to expect the finishing room to be dirty, and that dirty floors, tools, benches, booths, etc., are the rule. This need not be so.

Floors are the most noticeable. There should be someone delegated to clean the floors daily or on certain scheduled days. The use of a sweeping compound will keep down the dust.

There should be a program of reminders to all employees to help keep the premises clean by not throwing lunch papers, gum wrappers, etc., on the floor. Most employees will be cooperative, especially if trash containers are provided. Few workers are really dirty and sloppy in their work. If they are, the fault usually lies in improper training by the foreman or lack of proper supervision by the management.

A finishing crew that is working in a neat clean department, where neatness and cleanliness are encouraged, will also be careful in its work. This will reflect back to the person in charge, and will show up in superior work. The rule should be to have a place for everything, and try to get the employees to put everything back into its place when they are through with it. Have shelves for buckets and cans; drawers for small articles, small tools, and the supplies that should be locked up; hooks on the walls for hanging up brooms, wrenches, special jigs, forms, etc. If there is a place for everything, people learn where to look for certain things and feel more like replacing them too.

Some practical suggestions:

1) Appoint some person to keep the floors clean.

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2) Furnish proper receptacles for dirty rags, used filler tow, refuse, stain rags, etc.

3) Adopt a color scheme for the finishing room equipment and when there is a lull in production, or at certain regular intervals, repaint whatever needs it.

4) Clean your pressure tanks and spraying equipment at regular intervals.

5) Oil motors and pack grease cups of motors and pumps at specified intervals; not just when somebody happens to think of it.

6) Keep the idea and urge for cleanliness before employees in the form of signs, etc., and set an example by being neat and clean and orderly yourself.

This program of cleanliness will pay dividends in better quality work and fewer replacements of parts for equipment.—EDWIN HOGSTROM.

Research—an Asset to Your Business

Research is useful not only in developing new products, in improving present products, and in finding new uses and markets for them, but also in devising new processes and methods of production or new machines or equipment for use in producing at lower cost more and better goods for more people.

Research may well be carried on at present as a safeguard against the inevitable transition from a wartime to a peacetime program. New and better things will be demanded by consumers then, as in the past. What will they be? Research can be depended upon to give the answer.

To make research profitable, management must be willing to back up findings which have merit. The best yardstick for measuring research results is the actual appropriations for converting developments into tangible form. Research requires money, and profits for these expenditures cannot always be guaranteed.

Research will not pay if top management retains the conviction that present methods and policies are perfect and therefore inflexible. Management must be willing to correct its own misimpressions and cast aside habits of long standing.

Postwar prosperity will depend more than ever before upon the efficiency and progressiveness of our industries.—*Industrial Research & Development.*

Here in the United States we have more than 70,000 research workers in 3400 industrial laboratories, many engaged in chemical research. From these laboratories have come thousands of new chemical compounds. The American chemical industry has outstripped that of any other country in the world.

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A new illustrated brochure, printed in two colors, explains many interesting and valuable features about the big laboratory and its facilities. Copies of the brochure are free. Write the company's main office (350 Madison Ave., New York 17, N. Y.) or any branch office.

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Research Pays Off—A striking vindication of industrial research was provided in a recent address by Dr. Elmer K. Bolton, chemical director of the Du Pont Co. In 1942, he pointed out, almost half of the firm's gross sales consisted of products that either did not exist in 1928, or else were then being manufactured in trivial quantities.

"The fortunes of a research organization should not follow a profit-and-loss curve," added Dr. Bolton, in accepting the Perkin Medal for his outstanding scientific accomplishments. He recalled, in passing, that in the darkest depression days of 1932, Lammot du Pont had remarked: "You know, it is more important to carry out research than to pay dividends."

* * *

Looking Ahead—On this same theme, Richard Rimbach, consulting engineer of Pittsburgh, reminds us of a pungent remark credited to Charles F. Kettering: "Research is a means of finding out what you are going to make when you can no longer sell what you are making now."

* * *

Controls Should Stay—To those businessmen who advocate an early lifting of wartime controls, a sharp rejoinder has been issued by Professor John M. Clark, of Columbia University. He is the author of a detailed study on this subject, prepared in cooperation with the Committee on Economic Development, and published by McGraw-Hill.

Dr. Clark reminds us of the mistakes made immediately after the 1918 armistice in this direction. "To follow lines of least resistance," he warns, "and disband all controls instantly at the end of hostilities would be an invitation to chaos." It will be important to protect small business in the first buying rush; and, if we are wise, adds Clark, we will take steps to prevent a speculative boom of the type that ended in the 1920 collapse.

* * *

Health Via Paint—One of the most publicized of all wartime developments has been DDT, the potent new insecticide. Now two British chemists have found a new use for the material; they are adding it to paint.

The formulation is a water-base product, with an oil binder, containing a 5% solution of DDT. Applied to the inside of a cage, it kills flies as fast as they are hatched. A variety of interesting peacetime possibilities are opened up by this disclosure; wall coatings for factories, schools and hospitals may henceforth serve as efficient medical agents.

* * *

New Tires Win Approval—How good is our current synthetic rubber? Some reassuring news comes from the American Automobile Association. Following a 25,000 mile road test, we are advised that the new passenger car tires will stand up for over 37,000 miles of driving. More than 22,000 additional miles can be added by recapping, continues this report.

One big "if" must be added:

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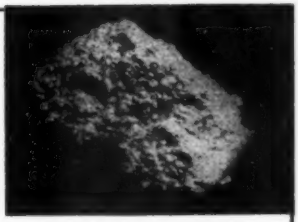

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1945-grade synthetics should not be driven over 35 miles per hour, and proper inflation is also essential. The tires used in this noteworthy test were made by six different manufacturers, and all were bought at random in retail stores. An additional study of synthetic rubber tubes also showed heartening results.

* * *

Super Fuels Must Wait—Those rosy dreams of high-octane gasolines that will propel an automobile up to 50 miles an hour were rudely shattered a few weeks ago by C. B. Veal, manager of the Coordinating Research Council. "I have yet to meet anyone," he remarked, "who would care to drive with an engine under the hood that would make the same noise as the power plant of a fighter plane or bomber."

In addition, Veal points out that the pressure generated by these potent wartime fuels enormously increases engine stresses, affecting the bearings, pistons, spark plugs and other vital engine elements. Gasoline power, he maintains, might possibly increase 5% and that gain depends primarily on improvements in the vehicles.

* * *

Electrostatic Spraying—The authoritative organ of industry, *Business Week*, rarely delves into problems of paint finishing; but, in a recent issue, this magazine devoted considerable space to a detailed review of recent progress in that fascinating wartime development—electrostatic paint spraying.

Originated by the Harper J. Ransburg Co. of Indianapolis, equipment is now being leased to other manufacturers throughout the country, with enthusiastic reports arriving constantly. The Japan Co. of Cleveland has registered paint savings of up to 50%. The Florence Stove Co., of Gardner, Mass., claims equally substantial economies in materials — and adds that paint booths, which formerly had to be cleaned twice daily, are now tidied up only once in six weeks. At the Chipman Kniting Mills, in Easton, Pa., which is producing land mines for the army, one girl looks after the entire finishing line.

The article to be coated is passed through an electric field, the electrodes being fine wires. Fixed guns are employed, special tips having been designed by DeVilbiss, Binks, and others. A charge is imparted to the sprayed particles of the coating, causing them to be attracted to and be deposited on the article with the minimum loss of paint or lacquer.

* * *

Tightening Our Belts—"We are not going to get out of this war without a little real industrial suffering," was the recent warning of Frank S. Whiting, War Production Board official. "It is certain that production of some commodities will be far below the amount authorized."

* * *

Airplane Outlook—Everybody concedes that our aviation manufacturers will face the most serious reconversion problem in all American industry. But the blackest picture yet presented has come from John A. Willard, president of the Association of Consulting Engineers.

In his opinion, not more than 8% of that industry's facilities can be utilized for peacetime production. Willard offers a much rosier picture of the nation's total plant; in all but a few lines of activity, he contends, resumption of civilian pro-

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Clark Field has been taken and, while this is being written, Manila is forty miles away.

The success of the Sixth Army's amphibious operations and conquest of many islands under able leadership is, in fact, due to American industry's engineering brains and fabulous production capacity.

All of us on the home front, who have done our part, can feel justly proud of our men, machines and able military leaders.

Listed here are a few of the war products now being coated with our materials. Phone, wire or write and let one of our finishing experts help you "keep production rolling."

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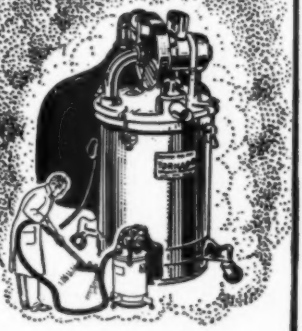

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duction will be a relatively simple matter.

* * *

Warning to Industry — A time bomb has been thrown into automotive circles by R. L. Polk & Co., long the official statisticians of motorcar manufacturers. In a striking survey based on queries to 30,000 car owners, the research organization reports that 76% declare they will not buy new cars if the retail selling price is 25% to 30% higher than prewar levels.

On the other hand, auto dealers are more optimistic. 53% of those questioned replied that price increases will have little effect on peacetime demand. [Our guess: Most people will pay the increased prices.—ED.]

* * *

Bleak Prospects — A thick curtain of gloom surrounded the annual Chicago furniture show in January. All hands joined in declaring that the 1945 outlook is the darkest for the industry since Pearl Harbor.

Fabrics are affected by the freeze on cotton goods; many of the metals are tight; and lumber is the most elusive of all. On top of these headaches, the manpower crisis makes the picture even blacker. Of course, there is a cheerful side to the picture: The enormous backlog of demand that has been built up throughout the country guarantees several bountiful years as soon as restrictions are eased.

* * *

Service for Readers—Subscribers to INDUSTRIAL FINISHING who may be planning a visit to Manhattan are reminded that free tickets to many leading radio broadcasts may be obtained on request. Among the sponsors currently cooperating in this service are: Phillip Morris & Co., Ltd., Cities Service Oil Co., Eversharp Pencil Co., and the Bristol-Myers Co. Drop a line to: *Lawrence H. Singer, 130 West 86 Street, New York 24, N. Y.*

Among the new Broadway shows worthy of your attention are: "Sing Out, Sweet Land," the Theatre Guild's rousing musical cavalcade; "The Hasty Heart," a moving war drama, and "On the Town," another gay musical show.

Research—The research organization is only part of the team necessary to bring the fruits of scientific work to the service of mankind. It requires the wisdom and courage of management to make the investment, a capable engineering organization to design the plant, an able and experienced production organization to make material of marketable quality and suitable cost, and a sales organization to develop markets.—E. K. BOLTON, DuPont Co.

Creative Color and Design
STUDIO
A Professional Service for Wood, Metal and Plastic Products
NORMAN H. VOIGT
Lake Shore Road Kenosha, Wis.

MISKELLA
INFRA-RED OVENS & APPLIANCES
INSULATED - REFLECTIVE - SECTIONAL
BY
INFRA-RED ENGINEERS & DESIGNERS
1632 E. 40th STREET - CLEVELAND, OHIO

Can you equal these

BURDETT

(The Original)

Infra-Red Gas Burner

DRYING RESULTS?

Indirect—Fired Time
30 to 45 minutes—300° F.

Burdett Infra-Red Time
10 to 15 minutes—300° F.

Burdett saved 22% in gas consumption. Burdett increased production 125%. Burdett matched pieces perfectly—impossible by indirect-fired methods. Nothing short of Burdett Infra-Red Gas Burners can give you these results. Investigate this revolutionary heat process without delay.

Burdett Infra-Red Equipment in plant of Master Finishers, Chicago.

A few choice distributor territories still open.

21 NORTH LOOMIS STREET, CHICAGO 7, ILL.

BURDETT MANUFACTURING CO.
Infra Red Gas Burners

Just Daub It On and Scrape It Off

That's all there is to keeping your spray booths clean. A boy with an old brush and a wide putty knife can recondition any spray booth, tunnel walls and fan blades in a couple of hours with . .

DOSTER BOOTH KOTE

This tested and approved protective coating for spray booth walls is an excellent time, work and money saver in every spray room. Daubed on clean walls with an old brush—scraped off, with its overspray paint load as easy as peeling an orange. Try it once—you'll never be without it. 5 gals. will protect 10 average booths.

Doster Booth Kote in 5 gal. kits—$6.25 F. O. B. Chicago

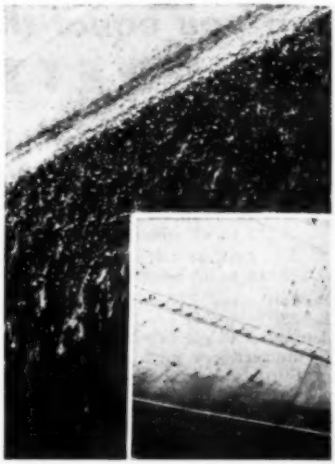
DOSTER & COMPANY, 4840 W. Superior St., CHICAGO 44, ILL.

Makers of TEXKIN, the Invisible Glove Skin Protector containing Lanolin.

Special Paint Prevents Barnacles on Ships

THE U. S. NAVY has turned to chemistry in its age-old battle against the barnacle. The dark part of the accompanying picture shows how a ship's under-water surface looks with an eight months' growth of "sea beard". In the lighter part of this picture the ship was painted with an antifouling paint. Antifouling paints contain poison to prevent barnacles from cementing themselves to a ship's hull.

Plasticizers, such as "Hercolyn" are used in antifouling paints to keep them open and soft, allowing the poison to protect the surface of the ship. "Hercolyn" is used in the Navy's antifouling paint which is specified for wooden-bottom craft such as mine sweepers and certain types of landing craft.—HERCULES POWDER CO.



Darker portion of picture shows growth of barnacles attached to bottom of ship.

SOLVENTS RECOVERED BY
THE LOFGREN PROCESS
We RECOVER YOUR
SOLVENTS & THINNERS
from . Sludge . Waste . Wash . Spoiled Lacquers, etc.
Each customer's shipment, whether one drum or a carload receives PROPER AND SEPARATE TREATMENT. Write to:—
SOLVENTS RECOVERY SERVICE
1019 Broad Street, Newark, N. J.
or
HAMMOND CHEMICAL SERVICE
241 Brunswick St., Hammond, Ind.

Remove Production Line Dust, Lint, and Sand Particles with this Soft Tacky Cloth before applying finish.
CRYSTAL TACK RAGS
Gross Lots Available Thru Paint Dealers or from the Processor.
Baughn Chemical Products Co.
8151 So. Crandon Ave., Chicago 17, Ill.

How We Have Planned for Reconversion

IN HANDLING the work done for us by our various sub-contractors, it has been interesting to note how all along the various cleaning problems, arising out of war production, are being coordinated with postwar planning, and also how postwar planning is taking advantage of lessons learned during war production. The past 2½ years have made most of us increasingly production conscious. Shortage of man-power has increased the use of conveyors, automatic washers, degreasers, and automatic or semi-automatic painting equipment.

INCREASED PRODUCTION AT A LOWER COST

ON ESSENTIAL SMALL PARTS

30 loads per hour can be processed in Lacquer or Enamel with our No. R-200 up to 75 lbs. to a load.

RONCI "SPEEDIP" WHIRL ENAMELER AND COMBINED WASHER AND DRYER

A combination dipping-whirling machine for coating large quantities of small parts. All operations are within the machine. Parts are dipped into coating material, raised and whirled. No additional tanks required. No cleaning when changing colors. Cuts costs and saves up to 90% of material.

Washer and Dryer operates on same principles.

Write for further information or submit samples to be coated.

RONCI MACHINE CO.

2 Atlantic Blvd. Centredale 11, R. I.

Just for the Record

REMEMBER THESE NAMES

After V-day they will mean something to you!

▼

CEL-U-LAK

A complete line of cellulose derivative lacquers and enamels.

▼

FORM-A-ROC

A unique line of quick-baking, tough adhesive synthetic enamels.

▼

THE VARNISH PRODUCTS CO.

5208 Harvard Avenue **Cleveland, Ohio**

While manufacturers have been purchasing equipment for war production, their thoughts at the same time have turned logically to the question of whether or not that equipment might have a place in their plans after the war and, in most cases, equipment has been so ordered or so designed and so installed that it would be of use or value in civilian production.

In our own particular case we have found it necessary to install elaborate washing equipment. This will have a definite place in our postwar production lines. Among with this has come the increased use of conveyors which have been so installed as to be readily transferred. Modern water-wash spray booths, installed primarily for war production, are going to fit nicely into postwar plans, and long banks of infra-red lamps are going to quickly dry the paint on civilian goods, just as they did so quickly and efficiently dry the paint on war products for which they were installed.

When peace finally comes and civilian production takes the place of war production, the major portion of the equipment in our plant, and also in many other plants, is going to be so changed and converted that our customers are going to receive the benefit of lower production costs and better finishes. Furthermore, all of us should be prepared to furnish civilian goods much more rapidly, and thereby take care of the enormous demand that has arisen.

One other point that has impressed me all along is the detailed inspection that has been given all war products. This has necessitated quality production as well as quantity production. Everyone has become more "inspection minded" than ever before and, while the amount of inspection undoubtedly will be decreased, it would seem logical that inspection is here to stay and that the quality of goods produced after the war is going to be benefited.

If any of the ideas that I have so hastily jotted down here prove to be of any value to you, I shall indeed be happy. I have enjoyed reading your magazine and wish you and your associates every continued success.—H. F. DEAN, Sub-Contract Executive.

* * *

AS TO conversion, our painting finishing department needs no change in the layout except we will add an infra-red tunnel, and change to short-bake enamels to hasten drying on our hand-operated lawn mowers. Our power mower setup is adequate for the

NALCO

Infra-Red Ray Lamps

Best for Infra-Red Ray Baking and Drying

Carbon Filament Lamps, service proven, available in Inside-Silvered (self-reflecting) or in Clear Glass types. Write for details.

North American Elec. Lamp Co.
1030 Tyler St. St. Louis 6, Missouri

DUST AND LINT
ARE THEY SLOWING UP YOUR PRODUCTION? IF SO,
Detroit Handy Tac Rags
will solve your problem. Remain tacky indefinitely. Non-combustible. At your Paint Dealer or write to Manufacturer.

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418 NORTH SAN PEDRO STREET
LOS ANGELES 12, CALIF.

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CHEMICAL CARTRIDGE RESPIRATOR No. 10

Worn by thousands to guard against hazardous

PAINT SPRAY FUMES

Ideal protection against paint, lacquer, enamel vapors. Cartridges are of colored plastic. When ordering, specify WHITE for Code A; BLACK, Code B; YELLOW, Code AB. (No corrosion as with metal cartridges—no crushing and spilling chemicals as with paper cartridges.) Price $54 doz.

Sample $4.50 pp.

H. S. COVER
SOUTH BEND, INDIANA

MIRACLE

5 Gallon BLUE BOY Model

PAINT REJUVENATOR

Restores Paints, Lacquers, Enamel Products and Pigment Primers, to original consistency in 3 to 10 minutes without opening the can. Available for Round or Square 5-gallon cans. Explosion-proof electrical equipment if desired. Also other units from ¼-pint to 50-gallon drum capacity available. Originators of Paint Rejuvenating equipment — ten years — thousands of satisfied users.

Miracle Paint Rejuvenator Co.
127 E. 9TH STREET ST. PAUL, MINN.

RUST works a 168-hour week!

Night and day, rust in your plant is costing you money. Science has found a new way to stop it—TECTYL *seals* metal surfaces against moisture for as long as two years, eliminating all possibility of corrosive action. Easy to apply and remove, economical to use, Tectyl gives you *positive* protection. There are five specialized Tectyl types, each engineered to a specific need. Write us *your* corrosion problem, and we'll send a Tectyl bulletin with complete application data.

TECTYL
STOPS RUST

VALVOLINE OIL COMPANY
456 Culvert St. Cincinnati 2, Ohio
Refinery at Butler, Pennsylvania
General Offices, Cincinnati, Ohio

SAFEGUARD YOUR SPRAY BOOTHS

Apply Wyandotte Spray Booth Coating *first* for quicker removal later of layers of inflammable paint. It takes only a thin coating to make cleaning easier, speedier, more economical. Write Wyandotte Chemicals Corporation, J. B. Ford Division, Wyandotte, Michigan, for full details!

Wyandotte F-100* will help cut your floor-cleaning costs. Even heavy soil disappears when this remarkable compound gets to work!

*Registered Trademark

PRESTO
EST. 1915

SAFE - FAST - CLEAN

FIREPROOF REMOVER—
The safest remover available—removes old surfaces and fire hazards.

PRESTO LIQUID REMOVER—
The fast acting remover—destroys old finishes in 20 minutes.

PRESTO MAGIC REMOVER—
The cream remover—clean cutting, rapid—for horizontal or vertical work.

PATTY REMOVER AND CHEMICAL CORP.
19 Gay St. Manhattan 14, N. Y.

immediate future, although this can be expanded easily if such a move is desirable.

The real problem will be to break in some stripers and finishers; this takes time. Mechanical striping devices and silk-screen methods are too slow for applying decorative colors to our lawn mowers.

Since the consolidation of another large lawn mower company with our concern, I expect to be in readiness with the setup for turning, finishing and polishing about 1,000,000 wood handles and wood rollers each year. This is a sizable little industry itself, and requires some room for drying and handling, but we are ready for it.—J. J. TARTTER.

Over-Time Fallacies

THE ONLY point to admire in over-time is what it does for profits. When it does nothing there, or less than it should, it has no right to the industrialist's friendship; no, not even his tolerance.

Time forms only one element going into accomplishment of work. Energy is of equal importance. Stretching time helps very little unless some means can be found for increasing energy, or for using the present supply to better advantage. The executive who toils three hours overtime isn't nearly so efficient as the man who works two extra hours, builds up his energy with the third hour.

But men formerly worked 10, 12, or more hours as a steady routine. Or did they? They may have been on the job that length of time, but not under the severe strain the industrialist experiences constantly.

Fine...Fine
Superfine!
Claremont Flock
Finely cut fabric particles, many colors, many types . . . fluffy, yet filling. Excellent for sound-proofing, insulation and surface protection. Also, applied decoratively to assimilate suede leather finishes, velvet, velour and mohair upholstery effects. Full details, samples and prices upon inquiry.
COTTON
WOOL
RAYON
CLAREMONT WASTE MANUFACTURING CO.
The Country's Largest Manufacturers of Flock
CLAREMONT, NEW HAMPSHIRE

Often, too, their occupations were seasonal; they drew heavily on their reserves of strength for a while, knowing they could regain energy in the "off season." The executive who, under today's terrific pace, tries to match those hours around the calendar, expecting two weeks of vacation will make everything right once more, had better start training a replacement for his position. He will be needed before long.

Did you ever think how carefully you have managed work so helpers could cut over-time to a minimum, and how well you have succeeded in doing it for *them*? Then doesn't it seem sheer nonsense to claim you could not do at least part way as well for yourself if you used the same time-management principles, personally?

The sub-conscious mind warns you, "Ease up a bit. You cannot stand this pace all day and into the over-time hours. Hoard a little strength to see you through. You're earning the right to slow down because you will be working all that extra time." Sure enough, it takes the energy that has been saved back, to get through the over-time. The result: available energy has been stretched over more hours, but not necessarily over more work.

No one has ever found a method for making the body accomplish much after the mind has gone home! When you say, "I don't seem

to be getting any farther ahead by all these extra hours," you may be coming very close to the truth. —G. M. DODSON.

Classified Advertising

Rate: 50 cents per line per insertion—minimum $1.50

POSITION WANTED

As finishing salesman, service man or foreman finisher. Good color man. 15 years' experience as foreman in large plant in Virginia. Address IF-171, care Industrial Finishing.

POSITION WANTED

By foreman finisher experienced in radio cabinets, office desks, furniture. Prefer medium size town. Can handle any number of men; 25 years' experience. Address IF-172, care Industrial Finishing.

SUPERINTENDENT PRODUCTION PAINTING.

Will be available February 1. Thoroughly experienced in metal spray painting and finishing in mass production. 20 years' experience in all types of finishing. Layout, Designing, Cleaning, Masking, Methods, Cost, Safety and Manufacturing Problems of production spray painting. All replies held strictly confidential. Address IF-169, care Industrial Finishing.

SERVICE MAN WANTED.

We require the services of a man thoroughly familiar with all phases of wood furniture finishing. One who is qualified to demonstrate our products, who is a good color-man and who has initiative and personality. This is an excellent opportunity for the right man. Please furnish full particulars regarding past experience, present employment, draft status, etc. Address IF-160, care Industrial Finishing.

SALESMAN

Experienced in the sale of industrial varnishes, enamels, synthetics and lacquers, wanted by a prominent manufacturer to cover certain central states. A substantial amount of established business will be turned over to the successful applicant. This is an exceptional opportunity to make a permanent and profitable connection with one of the large and highly respected companies in the industry. Give complete details of past experience and present connections. All replies will be considered as confidential. Our own sales force is aware of this advertisement. Address IF-170, care Industrial Finishing.

STAIN AND FILLER MAN WANTED.

Long established independent manufacturer of industrial finishes wants capable man as head of Stain and Filler Department. Write fully as to experience, age, etc. Address IF-173, care Industrial Finishing.

HEAD CHEMIST

Wanted for midwest manufacturer of industrial finishes. Must have knowledge and experience in paint, varnish, lacquer and wood finishing materials. Opportunity for man with personality to get along with associates under his supervision. Submit experience, present connection, draft status, etc. Address IF-175, care Industrial Finishing.

SALESMAN WANTED

For Cleveland office of a national manufacturer of raw materials for paint, varnish and allied industries. Sales ability and personality more essential than technical training. Excellent future for the man who can qualify. Send photograph and complete details of past experience. Our employees know of this advertisement. Address IF-174, care Industrial Finishing.

WANTED.

Gold bronze powders—any quantity. Will pay cash. Submit prices and samples. MASSOVER BROS., 30 W. Washington St., Chicago, Ill.

WANTED TO BUY

5 to 10-gal. pressure feed flox tank with gun and fittings. State make, condition and price. MEILINK STEEL SAFE CO., Toledo 6, Ohio.

FOR SALE.

Approximately 170 gallons Sherwin-Williams spar varnish at $1.40 a gal.

Approximately 30 gallons high gloss red enamel at $1.60 per gal.

Approximately 30 gallons of Navy Grey baking enamel at $1.60 per gal.

This is all brand new material. THE TOLEDO DESK & FIXTURE CO., Toledo 2, Ohio.

WE BUY DIRTY SOLVENTS.

Don't throw away spent cleaning thinner, degreaser residues, etc. Send us a sample for quotations. We also reclaim for customers. DYTEX CHEMICAL CO., 267 Plain, Providence, R. I.

BAKING ENAMEL SELLOUT.

110 — 55-gal. drums Du Pont Black Baking Enamel @ 75c.
60 — 55-gal. drums Forbes Grey Baking Primer @ 65c.

In excellent condition. All or part. No priorities required. RAND CHEMICAL PRODUCTS CO., 2335 So. Mich. Ave., Chicago 16. Phone CALumet 2866-67.

CONGRATULATIONS...

ON BOTH YOUR FINE WORK AND FORESIGHT ON THE PAYROLL SAVINGS PLAN!

IN your wholehearted support of the Payroll Savings Plan, you are doing far more than backing the most valid system of war financing—and building a powerful dam against the onrush of dangerous inflationary dollars.

By encouraging the all-out participation of your employees in this greatest of all savings plans, you are helping to create a sound economy for post war days.

With this same plan, you are assisting working America to build a mainstay against the inroads of unemployment—to save for homes, education and old age comforts!

You and your employees, through *mutual* cooperation in this forward-looking plan, are gaining a new and closer understanding—the cornerstone of a firmer, *mutually* profitable relationship!

National benefits, too, follow the "All Out" effort you are making! The prosperity of our United States rests on the economic stability of both management and labor. Your Payroll Savings Plan is working constructively toward the assurance of both!

The Treasury Department acknowledges with appreciation the publication of this message by

INDUSTRIAL FINISHING

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council

Index to Advertisers

Advance Paint Co. ..... Front Cover
American Chemical Paint Co. 33
Arco Co., The 79

Baughn Chemical Products Co. 128
Beckwith-Chandler Co. 23
Behlen & Bro., Inc., H. 105
Berry Brothers 81
Binks Mfg. Co. 54-55
Breuer Electric Mfg. Co. 125
Burdett Mfg. Co. 127

Celanese Chemical Corp. 14-15
Cellusuede Products, Inc. 22
Claremont Waste Mfg. Co. 133
Classified Advertising 134
Clinton Company, The 88
Commercial Solvents Corp. 83
Cover, H. S. 131

Day & Co., James B. 26
Detrex Corporation 75
Detro Sales Co. 130
DeVilbiss Co., The 84-85
Dolan & Co., V. J. 5
Doster & Co. 127
Du-Lite Chemical Corp. 37
DuPont de Nemours & Co., E. I. 64-65
Duralac Chemical Corp. 117

Egyptian Lacquer Mfg. Co. 43
Electric Sprayit Co. 73
Enterprise Paint Mfg. Co. 20
Enthone Company, The 1

George Co., The P. D. 119

Hammond Chemical Service 128
Hercules Powder Co. 10-11
Hilo Varnish Co. 87
Horn Company, A. C. 24

Illinois Bronze Powder Co. 97
Industrial Chemical Development Corp. 123
Industrial Tape Corp. 16-17
Infra-Red Engineers & Designers 126

International Plastic Corp. 70-71

Kirk & Blum Mfg. Co. ..... Back Cover
Koch Sons, Inc., George 8

Lacquer & Chemical Corp. 95
Lawrence-McFadden Co. 125
Lilly Varnish Co. 12-13

Maas & Waldstein Co. 91
MacDermid, Incorporated 61
Mahon Co., The R. C. 68
Mearl Corporation, The 101
Miracle Paint Rejuvenator Co. 131
Mitchell-Bradford Chem. Co. 6
Monarch Lacquer Corp. 113
Murphy Finishes Corp. 49

Neilson Chemical Co. 39
New Wrinkle, Inc. 77
New York Woodfinishers Supply Co. 121
North Amer. Elec. Lamp Co. 130

Oakite Products, Inc. 35
O'Brien Varnish Co. 47

Paasche Airbrush Co. 21
Patty Remover & Chemical Co. 132
Perfection Paint & Color Co. 7
Pittsburgh Plate Glass Co. 18-19

Qualatone Products Co. 109

Randolph Finishing Products Co. 99
Rayon Processing Co. of R. I. 122
Reliance Varnish Co. 63
Rockford Varnish Co. 111
Ronci Machine Co. 129
Ross Engineering Corp., J. O. 27
Roxalin Flexible Finishes, Inc. ..... Second Cover

Sherwin-Williams Co. 58-59
Solvents Recovery Service 128
Standard Industrial Products, Inc. 115
Standard Varnish Works 45
Stanley Chemical Co. 103
Sterling Tool Products Co. ..... Third Cover
Stille-Young Corp., The 9
Sun Oil Co. 41

Taber Instrument Corp. 5
Titanine, Inc. 50-51

United Lacquer Mfg. Corp. 93

Valvoline Oil Co. 131
Varnish Products Co. 129
Verd-A-Ray Corporation 25
Voigt Norman H. 126

Walker Co., H. V. 107
War Loan Drive 135
Wyandotte Chem. Corp. 132

Zapon Division—Atlas Powder Co. 2

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Cash Must Accompany Orders

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And Still Going Strong!

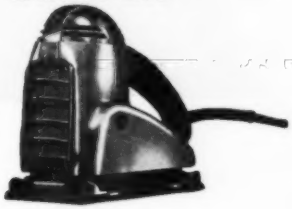
Sterling 1000 Portable Electric Sanding Machine in the Sterling Laboratory undergoing one of a series of "torture" tests. This machine ran well over 1000 hours with only occasional stops for check-up, oiling and brush changes. Actually no Sterling 1000 has ever worn out. Its estimated life is over 3000 hours.

The men who use the Sterling 1000 enthusiastically praise its performance and design . . . they *instantly* notice these outstanding qualities. But what the eye *doesn't* see is also extremely important. Master engineering and workmanship *plus* the very best of materials go into each tool. Every part and detail is exactingly built . . . all sub-assemblies and assemblies are carefully checked and tested. Such refinements *can't* be seen...they are *proved* by the smooth hum of the super-powered motor, by the fast, precise operation and in time, by the unusual endurance and durability.

THE STERLING 1000 REPLACES HAND SANDING . . . saves countless hours and dollars. Although many users buy it for a specific purpose, they are often delighted to discover that they have a tool which can be used for a wide range of finishing operations. The Sterling 1000 is for all types of sanding (coarse or fine) as well as for lapping and polishing.

See your distributor today or write!

STERLING
1000 PORTABLE ELECTRIC SANDER



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Efficient Industrial Ovens

. . . come only from ENGINEERING "KNOW-HOW"

The Kirk & Blum Engineering Staff, backed by 36 years of experience, is thoroughly grounded in the efficient design and installation of equipment involved in product-finishing operations.

In such operations, industrial ovens—necessitated by modern high-speed production—perform an important role. And here again the expert knowledge and scientific approach of Kirk & Blum Engineers has come to the fore, providing highly efficient, economical ovens for many leading manufacturing plants throughout the nation.

Our engineers plan, design, and erect complete oven installations of any type—continuous conveyor drying and baking ovens, core baking ovens, etc. These systems are guaranteed by Kirk & Blum to speed production . . . reduce fuel and labor costs . . . save floor space . . . promote maximum safety.

Don't take chances with a "hit-or-miss" oven installation. Get the unbiased counsel and scientific planning of experts—Kirk & Blum Engineers. Write to The Kirk & Blum Manufacturing Co., 2831 Spring Grove Ave., Cincinnati, Ohio, for Booklet "Industrial Ovens."

KIRK AND BLUM

AN ORGANIZATION OF ENGINEERS AND MECHANICS

We've Done Our Bit . . . Now Let's Do Our Best! BUY MORE WAR BONDS